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The newsletter contains information concerning meetings and conferences, publications of interest to echinoderm biologists, titles of theses on echinoderms, and research interests, and addresses of echinoderm biologists. Individuals who desire to receive the newsletter should send their name, address and research interests to the editor.

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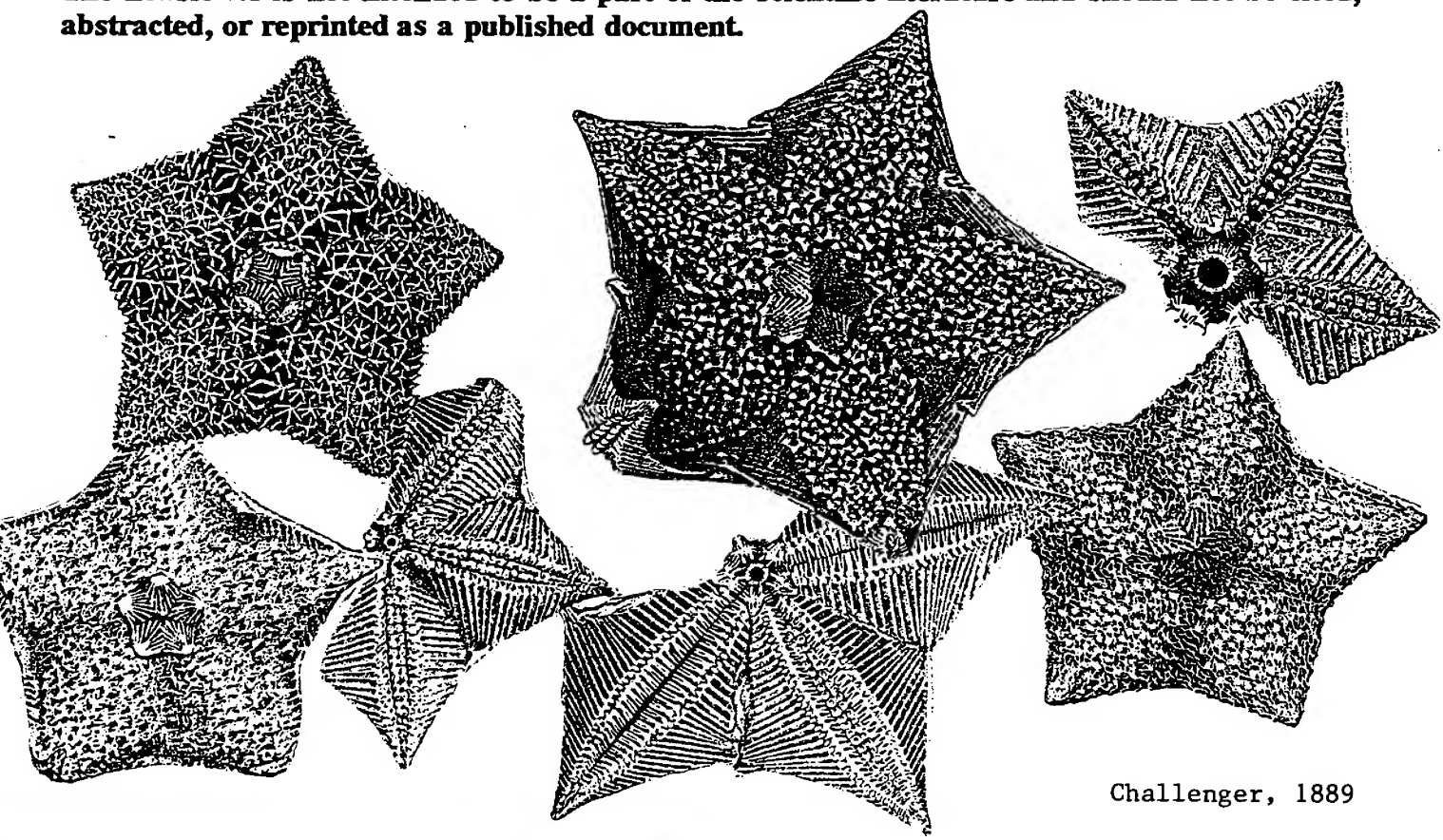

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ALI, M.S.M. - study of some Jurassic and Cretaceous echinoids of Sinai, Egypt.

ALLEN, J.A. - deep-sea benthos of the Atlantic.

ALLISON, W.R. - all aspects of *Culcita* spp. - feeding and foraging behaviour; habitat preferences and relationship to reef complexity (a scale problem); structuring effect on reef community; systematics. In process - Accuracy and precision of the line intercept and point quadrat approaches to reef surveys: the control of measurement error. Rapid reef survey methods for non-scientists.

ALVA, V. - trophic ecology of benthonic suspension organisms.

ANDACHT, T.M. - studying the mechanism of dorsoventral polarity disruption and inhibition of fertilization envelope elevation by nickel chloride in the sea urchin embryo, *Lytechinus variegatus*.

ARCHER, J.E. - reproductive biology, larval development and aspects of the ecology of the temperate holothurian, *Stichopus mollis* (for M Sc degree).

AUSICH, W.L. - Paleozoic crinoids.

BALSER, E.J. - development of the gonad in holothuroid echinoderms; function of the larval kidney in hemichordates and echinoderms.

BARTSCH, I. - parasites in brittle stars.

BASCH, L.V. - environmental effects on sea urchin (*Strongylocentrotus*) reproduction and development; influences of larval abundance and condition on settlement and recruitment of sea urchins; echinoderm larval nutrition; polar echinoid growth and secondary production; kelp forest ecology.

BAUER, J.C. - comparative study of the reproductive biology of the tropical echinoids *Diadema antillarum* and *Lytechinus variegatus* after exposure to internal bacterial disease (for a PhD degree from King's College London and Harbor Branch Oceanographic Institution).

BAUMILLER, T.K. - ecology and functional morphology of recent isocrinids; taphonomy of arms and stalks of articulates and advanced cladids vs. other Paleozoic taxa; diversity of Permian and Triassic crinoids and effects of the P/T extinction; patterns of turnover and extinction of Paleozoic crinoids; ecology of *Seirocrinus*; borings in Paleozoic pelmatozoans.

BAZHIN, A. - monitoring the condition of sea urchin populations (*Strongylocentrotus droebachiensis, S. polyacanthus*) along the Kamchatka peninsula shore.

BEAVER, H. - blastoid research.

BECKER, J. - marine invertebrates of Brazilian oceanic islands, including especially echinoderms.

BEGBIE, K.M. - studies on the hyponeural nervous system of the brittlestar, *Ophiura ophiura*.

BENEJAM DE SUAREZ, C. - occurrence of brooding *Amphiodia* sp. in Monterey Bay (California).

BENTLEY, A.C. - biology of the sand dollar, *Echinodiscus bisperforatus* along the southeastern coast of South Africa, encompassing growth, reproduction, genetics, larval biology etc.

BERENTS, P.B. - collection manager of marine invertebrates at the Australian Museum.

BERTRAM, D.F. - evolution and ecology of modes of development in echinoids.

BILLETT, D. - environmental impact on the deep sea; taxonomy of the genus *Mesothuria* (Holothurioidea).

BIRENHEIDE, R. - morphology, physiology and biomechanics of crinoids.

BIRYUKOVA, I.V. - chemoreception; chemosensory systems and its morphogenesis in the marine invertebrates.

BLAKE, D.B. - Cretaceous asteroids of Texas; Ordovician stelleroids; stelleroids of Seymour Island.

BOCKELIE, J.F. - Heliocrinitids (cystoids) from Scandanavia and the Bathic; taxonomy, functional morphology and palaeoecology.

BORZONE, C.A. - bioecological study of *Mellita quinquiesperforata* and *Encope emarginata* in beaches of Parana's state; influences of meteorological fronts in the structure of benthic macrofaunal communities in sandy beaches of Parana's state.

BOUDOURESQUE, C.F. - feeding behaviour of Mediterranean sea urchins; population dynamics and structure of Mediterranean echinoderms.

BOURGOIN, A. - studying the possibility of commercializing the green sea urchin *Strongylocentrotus drobachiensis* on the northeastern coast of New Brunswick.

BREGMAN, Y. - bioproductional properties (size-age structure, growth, recruitment, elimination, individual energy metabolism, energy balance, etc) and culture methods of local concentrations of commercial invertebrates (echinoderms and molluscs) inhabiting far-eastern coastal waters of Russia.

BRETON, G. - Mesozoic and Cenozoic asteroid evolution.

BROWER, J.C. - taxonomy, functional morphology, paleoecology, ontogeny and phylogeny of Ordovician crinoids from the northern midcontinent of North America; comparative ontogeny of Ordovician and Mississippian crinoids.

BUITRON-SANCHEZ, B.E. - Cenozoic echinoderms (Stelleroidea and echinoidea) from Baja California, Mexico.

BUSSARAWIT, S. - taxonomic study of echinoderms from the Andaman Sea, west coast of Thailand.

BYRNE, M. - life history evolution, echinoderm reproduction and development, ophiuroid functional morphology, echinoderm fisheries.

CALTAGIRONE, A. - sea urchin aquaculture.

CAMERON, R.A. - the specification of late cell types in sea urchin embryogenesis; development of the adult rudiment in larvae; genetic structure of sea urchin populations; a gene trap strategy to identify new upstream contro regions for spatially restricted gene expression.

CAMPBELL, A, - sea urchin population dynamics ecology and fisheries.

CAMPBELL, A.C. - zoogeography of Indian Ocean echinoderms.

CAMPBELL, D.B. - feeding behavior of *Asterias*.

CANDIA-CARNEVAL, M.D. - crinoid arm regeneration; structure, physiology and biomechanics of complex musculo-skeletal systems (echinoid lantern, ophiuroid masticatory apparatus).

CHAO, S.-M. - population dynamics of the shallow-water holothurians of Taiwan; systematics of the echinoderms from Taiwan.

CHEN, C.-P. - ontogenesis of skeletal plate patterns, gonad and gonapores in the progenesive *Sinaechinocyamus mai*.

CINTRA, C. - working in Espiritu Santo Island and adjacent waters with the sea cucumber (*Isostichopus fuscus*). Our main purposes are: a) the determination of longitude and drain weigth structure of the population under study; b) to estimate the rate, the curve and the individual growth equation with monthly data; c) to estimate the monthly and annual natural mortality rate; and d) the detection of presence and the determination of potential "banks" of the species. It is very important, because this organisms are considered as a species in danger of extinction, after a marked fisheries in different seas and is "protected" by the mexican government. The name of this project (with a study period of a year) is: "Biologia poblacional de *Isostichopus fuscus* (Ludwig, 1875) (Echinodermata: Holothuroidea) en el sur del Golfo de California".
I am also working on my B. Sc. Thesis. This document contemplates the shallow water asteroids of the Gulf of California and the principal tentative objectives of it are: a) to realize a systematic and taxonomic study of the sea stars present in La Paz Bay; b) to make a key (at least to the genera level) of the asteroid species reported within the gulf; and c) to analyze the biogeographic patterns of the species found in the Gulf of California.

COLON-JONES, D.E. - rearing *Diadema* larvae; rearing coral larvae; studying the sediment regime on Biscayne National Park reefs; examining calcification rates of corals.

CONAND, C. - sea cucumber fisheries; bioerosion by sea urchins; influences of echinoderm populations on reef functioning.

CREASER, E.P. - state of Maine, commercial green sea urchin resource management, tag and movement studies along the Maine coast.

CRUMP, R.G. - asteroid development and ecology.

CUTRESS, B.M. - deep sea Holothuroidea (Echinodermata) of Puerto Rico.

DAFNI, J. - echinoid growth.

DAYTON, P.K. - benthic ecology.

DE RIDDER, C. - symbioses between bacteria (mainly sulfur-oxidizing bacteria) and spatangoids-reproductive biology.

DE WIT, W.M.J. - fossil echinoderms in fluviatile and ice-age deposits of Holland.

DEARBORN, J.H. - functional morphology of ophiuroid tube feet; identification of Gulf of Maine and Antarctic ophiuroids and crinoids from collections on hand.

DEBENHAM, P. - population genetics of the red sea urchin *Strongylocentrotus franciscanus*

DIEHL, W.J. - effects of environmental stress on multilocus heterozygosity-growth relationships in invertebrates.

DOBSON, W.E. - population biology of *Ophiura sarsi* on continental slope off North Carolina; use of skeletal growth bands in ophiuroid ossicles as biological markers for sublethal predation and population ecology experiments.

DOLMATOV, I.Y. - mechanisms of regeneration, their formation and change; individual development of marine invertebrates.

DONOVAN, S.K. - writing a review chapter on the functional morphology of fossil echinoderms; documenting *Pseudocidaris* spines from a deformed Lower Cretaceous terrane in Hispaniola with Gren Draper and John Lewis; writing up the Pliocene echinoderms of the Bowden shell bed, Jamaica with Chris Paul; and ongoing research on the Jamaican Paleogene echinoids with Hal Dixon and others.

ELISEIKINA, M.G. - physiological and reparative regeneration of echinoderm internal organs.

ELLERS, O.W. - echinoid growth.

EMLET, R.B. - functional morphology of echinoderm larval evolution of echinoid life histories and development.

ETNIER, S. - comatulid crinoids.

ETTENSOHN, F.R. - systematics, paleoecology and functional morphology of the pelagic crinoid *Saccocoma*; paleoecology of an Ordovician *Ectenocrinus* garden.

EVDOMIKOV, V.V. - research of reproductive process of sea urchin; reproduction and development of marine invertebrates.

FAY, R.O. - Ovachita Belt bibliography.

FEDER, H.M. - Alaskan benthic systems of the Bering and Chukchi Seas (where sea stars are very common); the deep benthic system in Prince William Sound within and outside the oil-spill trajectory of the Exxon Valdez oil spill.

FERAL, J.-P. - structure of habitat and dispersal strategies; effects of developmental modes on genetic structure and evolutionary processes (mainly in echinoids - annelids and molluscs also used).

FERGUSON, J.C. - madreporite functions and water volume relationships in echinoderms - currently on echinoids and holothuroids.

FERNANDEZ, C. - growth, nutrition and biochemical composition of sea urchin *Paracentrotus lividus* in rearing fed with different types of artificial food.

FLAMMANG, P. - adhesive systems of echinoderm podia; ultrastructure, biochemistry of the adhesive and deadhesive substance, and adhesive force measurements.

FOSTER, M.W. - Ordovician echinoderms from western Virginia; Atlantic Ocean brachiopods; Antarctic and subAntarctic brachipods; paleobiology of Pennsylvanian invertebrates in Illinois.

FOX, D.J. - can genetic algorhythms be used to position a mechanical brittlestar arm?

FREEMAN, S.M. - impact and population dynamics of seastar predation on sublittoral communities. In particular, *Astropecten irregularis* on soft-bottom communities and *Asterias rubens* on commercial mussel beds, off the coast of Anglesea, North Wales; the relationship between the sea star *Astropecten irregularis* and its commensal polyniod *Acholoe astercola*.

FUKUYAMA, A.K. - looking at recovery of intertidal invertebrates in Prince William Sound, Alaska following the 1989 Exxon Valdez oil spill and am particularly interested in molluscan and echinoderm assemblages and the contrast in recovery patterns between areas that were treated with hot-water, high pressure treatment with areas that were oiled and untreated.

GAGE, J.D. - ophiuroid growth markers (inshore (deep-sea), deep-sea benthic population dynamics, community ecology and regional zoogeography in Rockall Trough area; deep-sea benthic environmental sensitivities to oil/gas related developments; deep-sea echinoid and holothurian taxomony

GAGNON, J.-M. - Arctic *Strongylocentrotus* spp.

GALLEMI, J. - Cretaceous echinoids (Tethyan - worldwide); systematics, biostratigraphy and palaeoecology.

GENTIL, F.A. - population dynamics of ophiuroid species in soft-bottom community of the English Channel.

GIBSON, M.A. - echinoderm paleoecology of the Lower Devonian of west Tennessee; epibiont paleoecology.

GIUDICE, G. - regulation of the synthesis of heat shock proteins in sea urchin embryos; molecular mechanisms of the establishment of embryonic axes in sea urchins; developmental toxicology in sea urchins; ribosomal RNA synthesis in sea urchins.

GLUCHOWSKI, E.L. - Genus *Haplocrinites* (Inadunata) from the Devonian of Poland.

GOGGIN, L. - diseases of starfish as a method of biological control.

GOLDBERG, A.S. - investigating antiarthritic properties of echinoderms.

GOODING, R.U. - animals associated with Caribbean diadematids; animals associated with diadematid echinoids, worldwide.

GRABOWSKY-KAAIA, G.L. - Albatross recolonization project via the Audubon Society and HI Dept. of Fish and Wildlife.

GREENSTEIN, B.J. - taphonomy of crown-of-thorns starfish; comparative taphonomy of caribbean reefs; mode of formation of Pliocene shell beds.

GROSJEAN, P. - sea-urchins cultivation; growth in controlled conditions; digestion process; effect of temperature, light, quality and quantity of food; model of growth of sea urchins.

GROVES, C. - *Heliaster* biogeography and systematics.

GRYGIER, M. - production of Myzostomida chapter for Vol. 4 of "The Fauna of Australia"; preliminary survey of myzostomes removed from crinoids in the Australian and Western Australian Museums; examination of long-lost Caribbean Myzostomida types at the Museum of Comparative Zoology; preliminary survey (with Igor Eeckhaut) of Myzostomida from comatulids in northern New Guinea; participation in UCSB survey of parasites of seastar *Asterias amurensis* in central and northern Japan; planned for 1996: taxonomic study of Myzostomida of Japan and the Ryukyu Islands; work up collection of Japanese Scottomyzon copepod ectoparasitic on *Asterias amurensis*; finish manuscript with Van Den Spiegel on taxonomy of parasitic barnacles (Microlepadidae) from *Diadema* in Singapore; work address from March 1996 through February 1997 is - University of the Ryukyus Tropical Biosphere Research Center, Sesoko Station, 3422 Sesoko, Motobu-cho, Okinawa 905-02 Japan - ph. 81-980-47-2888 - fax 81-980-47-4919.

GUENSBURG, T.E. - edrioasteroids, early crinoids, paleoecology of echinoderms.

GUERRAZZI, M.C. - natural history and the feeding behavior of the starfish *Echinaster brasiliensis*.

GUILLOU, M. - REPRODUCTION/RECRUITMENT: responses of sea-urchin population to environmental changes; BIODIVERSITY: seaweed-urchin interaction.

GURREA, I. - echinoids from the Cretaceous and Cenozoic age, Mediterranean region (specifically Western Europe).

GUTT, J. - Antarctic and Arctic benthos.

HADEL, V.F. - respiratory metabolism of *Chiridota rotifera* (small holothuroid found in beaches of coarse sand).

HAGEN, N.T. - sea urchin outbreak dynamics: ecological interactions in a macroparasite/sea urchin/ kelp forest system. Echiniculture/closed cycle cultivation of sea urchins: broodstock management, photoperiodic control of gametogenesis, growth, feeding, design of cultivation equipment.

HAMZA HASSAN, M. - ecology and biology of echinoderms from Gulf of Suez - Red Sea.

HAVARDSSON, B. - the effect of caroteins in feed and environmental temperature on the gonad color and gonad development of the sea urchin *Strongylocentrotus drobachiensis* (Mueller, 1776). The purpose of the experiment is to develop feed suitable for controlling the quality of the urchin gonad in echinoculture.

HAY, M.E. - 1995-2000 National Oceanic and Atmospheric Administration. "Human Environmnetal Linkages in the South Florida Coastal Ecosystem: Effects of Natural and Anthropogenic Stressors" (M. Harwell and 26 Co-Principal Investigators).

HEINZELLER, T.E. - comparative, mainly neuroanatomical, morphology (TEM, histochem.) of crinoids with special attention to milleri-, bourgeti- and cyrtocrinids; entoparasitic myzostomids of crinoids, mutual effects on host and parasite on an ultrastructural basis.

HENDLER, G.L. - behavior and functional morphology of deep-sea ophiuroids; taxonomy of Okinawan ophiuroids (with S. Irimura); systematics and natural history of eastern Pacific ophiuroids.

HERDENDORF, C.E. - invertebrate fauna associated with deep-sea (>2000 m) shipwrecks; invertebrate fauna of New Zealand (North Island) estuaries and tidal flats; brisingid fauna of North Atlantic Ocean; echinoid (esp. sand dollars) invasion of New Zealand estuaries following diversion of freshwater inflow.

HESS, H. - cyrtocrinid crinoids from Lower Jurassic of southern Switzerland; scyphocrinids from the Upper Silurian of Morocco.

HILL, R.B. - holothurian muscle physiology, local degeneration.

HODGSON, A.N. - reproductive biology of marine invertebrates including echinoderms.

HOLTERHOFF, P.F. - Late Paleozoic crinoid paleoecology and systematics; P-Tr extinction and eradication of the Crinoidea.

HOOPER, R.G. - development of sea urchin aquaculture method; ecology of *Strongylocentrotus drobachiensis*.

HOROWITZ, A.S. - bibliography of the fossil Blastoidea and database of blastoid taxa (with J. Waters).

HOSHI, M. - molecular mechanism of sperm-egg interactions in starfish and sea urchins; structure and function of glycosphingolipids in starfish and sea urchins; 1-methyladenine signal transduction in starfish oocytes.

HOTCHKISS, F.H.C. - larval homeomorphism, Loven's law and adult ray homologies in echinoids, ophiuroids and edrioasteroids; isolated ophiuroid vertebrae and ossicles from Devonian, Bohemia (with Petr & Prokop); Paleozoic ophiuroid morphology & evolution; teratology of sea stars; tetramerism/hexamerism in echinoids and stelleroidea; relation of larval axis to adult axis symmetry.

HOTTENROTT, S.I. - systematics and cladistic analysis of *Ophiomusium* and *Ophiosphalma*; preliminary notes on a troglobitic ophiuroid from the Bahamas.

IRIMURA, S. - taxonomy of Japanese Ophiuroidea; SEM observation on disk granules of Ophiuroidea.

IVY, W.G. - seed production and sea ranching of sea cucumbers.

JABLONSKI, D. - onshore-offshore and latitudinal patterns in the origins of higher taxa, and their subsequent shifts in environmental and latitudinal distribution; studying post-Paleozoic echinoids and stalked crinoids; studying mainly molluscan but some echinoid mass extinction and recovery patterns, especially at the Cretaceous-Tertiary boundary.

JACOBSEN, N.A. - identification and logging of occurrences of invertebrates, vertebrates and geologic features in the Monterey Bay; working especially with asteroidea analysis (WWW images and information will be available in the near future.

JAECKLE, W.B. - nutrient distribution among tissue in larvae; asexual reproduction by asteroid larvae.

JAGT, J.W.M. - Late Cretaceous and early Palaeocene crinoids, ophiuroids, asteroids and echinoids from the type area of the Maastrichtian Stage (southeast Netherlands, northeast Belgium) with emphasis on K/T boundary transition.

JAMES, D.B. - Seed production in sea cucumbers.

JAMIESON, G.S. - sea urchin abundance surveys; near-shore community population dynamics.

JANIES, D.A. - phylogenetic analyses of the evolution of development among asteroids.

JELL, P.A. - Australian fossil echinoderms - Cambrian to Tertiary (excluding Tertiary echinoids) particularly, 1. Silurian & Devonian crinoids & asteroids, 2. Permian crinoids, 3. Carboniferous crinoids.

JOHNSEN, S. - further investigation of the nature and mechanism of the extraocular sensitivity to polarized light in the ophiuroid *Ophioderma brevispinum*; biochemical, molecular and immunohistochemical study of the nature and distribution of the visual pigment in *Asterias forbesi* and *Ophioderma brevispinum*.

JUNQUEIRA, A.O.R. - population dynamics of echinoids.

KELLY, M.S. - feasibility of commercial echinoculture in Scotland (*Psammechinus miliaris*); echinoderm/ subcuticular bacteria symbioses.

KEUSKAMP, D. - recruitment of the endemic New Zealand echinoid *Evechinus chloroticus* (Echinometridae). Specifically focussing on settlement variability, natural recruitment variability, and experimental manipulation of processes operating immediately post-settlement (using cultured recruits), as well as aspectsof development and the chemical ecology of settlement. Especially interested in the effects of sediment on survivorship during and after and settlement, and techniques available to determine the nature of theseeffects. Also, the peculiarities of a marine reserve (as my major study site). Determining the relative influence these processes have on recruitment at several scales may have implications for the (small) roe fishery in New Zealand.

KLINGER, T.S. - nutrition of echinoids; feeding and ecology of holothuroids; digestive enzymes of echinoids and holothuroids.

KOBAYASHI, N. - marine pollution bioassay by using sea urchins; spawning periodicity of sea urchins.

KOGO, I. - crinoidea (living); its classification and distribution in western Pacific.

KURIHARA, T. - spatial distribution of starfishes; accuracy in estimating organism density with quadrat; endurance of mark on starfish.

LAMBERT, P. - an identification handbook to shallow water sea cucumbers of southeastern Alaska, B.C. and Puget Sound.

LANE, D.J.W. - The Echinodermata: a biological tool for the control and protection of marine benthic environments in Singapore waters.

LAWRENCE, J.M. - characteristics of arm regeneration in starfish; comparative nutrition of sea urchins.

LE MENN, J. - North African Paleozoic crinoids; benthic communities and sequential stratigraphy.

LeCLAIR, E.E. - ophiuroid arm skeletal morphology and biomechanics.

LEISMAN, J. - recruitment study of brittlestars in the Banana River; also, aspects of regeneration.

LESSER, M.P. - urchin aquaculture - use of photoperiod to manipulate gametogenesis in *Strongylocentrotus drobachiensis*.

LESSIOS, H.A. - molecular phylogeny of *Diadema*; gene flow in sea urchins; population dynamics of *Diadema antillarum*; effects of sea urchins on coral recruitment.

LEVERONE, J.R. - reproductive cycles of *Astropecten* and *Luidia* in lower Tampa Bay.

LEVITAN, D.R. - ecological and evolutionary consequences of sperm limitation in echinoderms; echinoid grazing pressure in the Caribbean.

LIAO, Y. - fauna Sinica: Ophiuroidea.

LITVINOVA, N.M. - revision of the genus *Ophiomyces* (Ophiacanthidae); new species and genus *Ophiuraster* (Ophiuridae); ophiuroids of New Caledonia.

LORDSON, J. - seed production and sea ranching of sea cucumbers.

LOVELY, E.C. - coexistence of hydroid predators in Tubularia larynx colonies.

LUCAS, J.S. - *Acanthaster planci* larvae and juvenile biology.

MACURDA, JR., D.B. - skeletal morphology modern crinoids.

MACZYNSKA, S.S. - Cretaceous and Tertiary echinoids particularly from Poland.

MAH, C.L. - a revision and phylogeny of the Brisingida, a group of unusual deep-sea asteroids; describing a new species of *Brisingella* from the Monterey Bay; visited the Smithsonian (June 1995) and found many lots of brisingids that may show different growth stages; a Pleistocene Ctenodiscus crispatus Retzius from Humboldt County, California (in prep).

MAIER, M. - studying asterosaponins.

MAKRA, A. - *Acrocnida brachiata* (Ophiuroidea) in Little Killary Bay, west coast of Ireland; population dynamics, reproductive biology, regeneration, bioturbation.

MALLEFET, J.C. - luminescent ophiuroids; morphological, physiological, ecological aspects.

MANNI, R. - systematics, morpho-functionality and evolution of Mesozoic non-isocrinid crinoids.

MANNIFIELD, K. - Dinantian crinoids from northwest Ireland; exploring Camerate ?extinction; crinoid palaeoecology, autecology and palaeobiology; also looking at carbonate reefal environments etc.

MARCOS-DIEGO, C. - study of benthic fauna and flora from the southern of the Livington Island (South Shetland, Antarctica).

MARSH, L.M. - revision of *Nardoa* and *Gomophia* (Asteroidea: Ophidiasteridae) - with F.W.E. Rowe; echinoderms of the northwest shelf of Western Australia.

MASCARENHAS, B.J DE A. - pattern of distribution of asteroidea from Guanabara Bay, Rio de Janeiro, Brazil.

MASSIN, C. - holothurian taxonomy; Easter Island, Indonesia, Papua New Guinea.

MATERIA, C.J. - ecological study of invertebrate and plant communities at a proposed sand mining site on King Island, Tasmania, Australia.

MATTOS-SEGOVIA, E. - the assessment of bioinducers of the settlement in larvae of sea urchin *Loxechinus albus*.

McCLINTOCK, J.B. - chemical ecology of echinoderms from the Gulf of Mexico and Antarctica.

McKENZIE, J.D. - subcuticular bacteria in echinoderms; antifouling mechanisms of echinoderms.

McLELLAND, J.A. - ophiuroids and holothuroids from near coastal areas of northeastern Gulf of Mexico, Florida coast, and West Indies; ecology and taxonomy.

McNAMARA, K.J. - Neogene species of the clypeasteroid *Peronella* from Western Australia; Paleocene spatangoids from the Carnarvon Basin, Western Australia; Miocene echinoids from the Carnarvon Basin, Western Australia; Eocene echinoids from the Bremer Basin, Western Australia; fauna of Australia -spatangoids, holasteroids, clypeasteroids, cassiduloids (with Rich Mooi); general echinoid morphology, physiology and biogeography.

MEDEIROS-BERGEN, D.E. - molecular identification of echinoderm larvae transport, dispersal and small scale hydrodynamics of sea cucumber larvae.

MEIJER, L. - cell division cycle control using starfish oocytes and sea urchin eggs; anti-mitotic drugs discovery using purified kinase from starfish oocytes.

MESSING, C.G. - ecology and taphonomy of western Atlantic stalked crinoids; ecology, taxonomy and phylogeny of comatulid crinoids.

MEYER, C.A. - paleoecology of starfishbeds in the Tertiary of the Vienna Basin (Austria); taxonomy and paleoecology of Upper Jurassic echinoderms from the Swiss Jura mountains.

MIRONOV, A. - taxonomy and biogeographic history of recent holasteroid echinoids.

MITROVIC-PETROV, J.R. - study of some Cretaceous and Neogene echinoids of Serbia (taxonomy, paleoecology, functional morphology, taphonomy).

MLADENOV, P.V. - parthenogenesis in brittle stars; reproductive biology of echinoderms in New Zealand fiords; reproductive biology of Fijian echinoderms; environmental factors influencing asexual reproductive processes in echinoderms; population genetics of asexual echinoderms; morphological and genetic variation in *Amphipholis squamata*.

MORRILL, J.B. - gastrulation in the sea urchin, *Lytechinus variegatus* and *Echinometra* sp.

MOTOKAWA, T. - catch connective tissue (mechanics, morphology, physiology); biology of stalked crinoids; neuropeptides of echinoderms.

MOUCHATY, S. - molecular systematics of the Mellitidae.

MUKAI, H. - ecosystem study in tropical and boreal seagrass beds; bioturbation and restructural effects on material flow at interface of sea floor.

NAIDENKO, T.K. - cryopreservation of sea urchin embryos and larvae bioassay by using sea urchin eggs and embryos.

NAKAMURA, R.K. - involved with AQUAVAN, an educational outreach program for the Vancouver Aquarium. I travel around the province of British Columbia bringing seashore life, including sea stars, sea urchins and sea cucumbers into schools to teach children about aquatic conservation.

NAKANO, E. - extracellular matrix in the sea urchin embryo.

NEBELSICK, J.H. - taphonomy of reef echinoids; Lower Miocene echinoid palaeobiogeography.

NEILL, B.J. - biogeography, systematics and population biology of echinometrids.

NESTLER, H. - Cretaceous echinoids.

NEUMANN, C. - phylogeny and paleoecology of Toxasterid echinoids; echinoids and gastropod predation; Cretaceous echinoids from the Betic Cordillera (Spain); functional morphology of Cretaceous echinoids.

NICHOLS, D. - seasonality in the New Zealand crinoid *Oxycomanthus plectrophorum* (with P.V. Mladenov, Otago, N.Z.); reproductive cycle in Luidia ciliaris from the English Channel.

NICOSIA, U. - systematics and palaeoecology of Jurassic crinoids; evolution and stratigraphy of non-isocrinids.

NISHIHIRA, M. - effect of heart urchins on coral community structure of the sandy bottom.

O'CONNOR, B.D. - bioturbation rates of infaunal echinoderms; connection between hydrographic features and high density ophiuroid populations.

O'HARA, T.D. - echinoderms of Macquarie Island (final stages); patterns of diversity for faunal assemblages on subtidal reefs off central Victoria (Ph.D. thesis, University of Melbourne).

OJEDA, F.P. - abundance and distribution patterns of subtidal macroinvertebrates of South Bay, Doumer Island, Antarctica.

OJI, T. - paleontology and biology of stalked crinoids; especially regeneration of crown and arms, and evolutionary history of isocrinines.

OLSZEWSKA-NEJBE, D. - irregular echinoids (particularly the genera *Micraster* and *Echinocorys*) from the Poland and western Kazakhstan, comparison of the Turonian-Coniacian irregular echinoids in the North European Province; paleobiogeography of irregular echinoids during the Late Cretaceous.

OLVER, J. - Mesozoic irregular echinoids; extant British species.

PABIAN, R.K. - Late Pennsylvanian crinoids, systematics, paleoecology, biostratigraphy.

PAGETT, R.M. - Caspian Sea: literature review.

PARDO, R.A. - ecology and population dynamics of echinoderms (particularly echinoids and ophiuroids) - currently, population dynamics of sand dollars.

PARMA, G. - fossil echinoids.

PAULS, S.M. - inventory of species and bibliography of the echinoderms from Venezuela, South America.

PENCHASZADEH, P.E. - ecology of sand dollars (*Mellita* spps); trophic ecology of asteroids.

PENNINGTON, J.T. - primary production in the central California upwelling zone; brachiopod larvae of the Monterey Bay Submarine Canyon.

PEREZ-RUZAFA, A. - wetlands and coastal lagoons of Galapagos Islands (Ecuador) - basis for its protection and management; Iberic fauna; study of benthic fauna and flora from the southern of Livingston Island (South Shetland, Antarctica); design of new algorithms for the primary productivity and water quality prediction in coastal zones using remote sensing techniques.

PETR, V. - an internal grant award from the Grant Agency of Charles University, n. 134/94 (years 1994-1996): "Trace elements in crinoid skeletal remains (Echinodermata) from the weathered limestones of the Bohemian Lower Devonian (Barrandian area)" with co-authors: M. Mihaljevic, O. Sebek, R.J. Prokop. The crinoid ossicles studied come from the so-called "white beds" of the Barrandian area (highly weathered limestones) which originated, probably by ground water solution, from fine grained Upper Silurian and Lower to Middle Devonian limestones along zones of tectonic faulting. In the "white beds", the original limestone cement is highly weathered, disintegrated and decalcified. On the contrary, all the echinodermal skeletal elements are invariably low-magnesian calcite. It is important to point out that in the true "white beds" the echinodermal ossicles are always present, typically well-preserved and frequently show the original stereom. The preservation of stereom is of great importance for

palaeobiology because its microstructure reflects particular kinds of original soft tissue in these plates. Although such a natural developing of ancient stereom is very probably a world-wide phenomenon, practically no attention was given to it outside Bohemia and was partly unknown or supposed to be extremely exceptional. This project includes studies in geochemistry, biogeochemistry, biomineralization and isotope geology.

PHILIPPE, M. - Miocene echinoids in the Mediterranean domain.

PIEPENBURG, D. - densities and distribution of brittle stars in the Laptev Sea.

PIESSE, C.C. - systematics of New Zealand starfish.

PODOLSKY, R.D. - effects of temperature and viscosity on fertilization and larval biology, especially in echinoids.

PORTELL, R.W. - miocene echinoids of Florida.

PRESTEDGE, G.K. - study of Pittwater, S.E. Tasmania, re: the regrowth of *Zostera* sp., also *Codium* sp. beds now that nutrient levels in the water have decreased with upgrading of local sewerage treatment plants, and to see if several species of echinoderms return if the above species of algae recover sufficiently.

PROKOP, R.J. - new implications for palaeobiology of float-bearing crinoids from the Bohemian Upper Silurian - Lower Devonian; genus *Pygmaeocrinus* Bouska (Crinoidea) in the Devonian of Barrandian (Czech Republic) with Dr. V. Petr.

1) participation in the project "Czech Ordovican as a World Standard" - for first result see Mikuláš - Petr - Prokop (1995) in current publications (this issue of newsletter) (Grant Award from the Grant Agency of the Czech Republic). 1994-1996.
2) preparation of a report on the first found of the genus *Lampterocrinus* Roemer, 1860 (Crinoidea, Camerata) in the Bohemian Silurian.
3) preparation of the revision of the genus *Pygmaeocrinus* Bouška, 1946 (Crinoidea, Inadunata) in the Bohemian Devonian.
4) interpretations of the geochemical and isotope results of investigations of crinoid skeletal elements from the Upper Silurian and Lower to Middle Devonian of the Barrandian area (Grant Award from the Grant Agency of Charles University). 1994-1996.

RAJAKUMAR, C.P. - ecology, seasonal variation, population dynamics and distribution pattern of echinoderms of South-west coast of India.

REGIS, M.-B. - population dynamics of regular echinoids in the Mediterranean; enzymatic study of the nutrition of *Paracentrotus lividus* (Echinodermata: Echinoidea).

REICH, M. - fossil holothurians, especially on Campanian/Maastrichtian holothurian sclerites from Northern Germany, Denmark and England, and furthermore on Jurassic holothurians from Thuringia and Harz Mts. (Germany).

REY, D. - Creataceous and Tertiary echinoids of Spain.

ROBINSON, S.M.C. - green sea urchin fishery ecology; roe enhancement of the green sea urchin;

development of artificial diets for sea urchins.

ROCCATAGLIATA, A.J. - chemistry of physiologically active compounds isolated from starfishes and brittle stars in the South Atlantic Ocean.

RODRIGUEZ, S.R. - subtidal brown macroalgae forests as food sources for intertidal organisms: role in determining community patterns in the rocky intertidal environment.

ROGERS-BENNETT, L. - examining the impact of larval feeding history on the growth and success of newly settled red sea urchins; examining the survival of newly settled urchins exposed to micro-predators in the benthos; spatial patterns in the growth and survival of juvenile red abalone.

ROSE, E.P.F. - Jurassic irregular echinoids; Cenozoic holectypoid echinoid *Echinoneus*.

ROTMAN CLARK, H.E.S. - systematics of Southern Ocean asteroids and ophiuroids.

ROUX, M. - stalked crinoids: Jurassic to Recent; ontogeny; taxonomy of modern bathyal and abyssal stalked crinoids; bathyal ecology.

ROWE, F. - Indo-west-Pacific echinoderms and their systematics and zoogeography.

SABA, M. - taxonomic studies of Japanese sea-stars.

SANFORD, E. - foraging behavior, recruitment, and growth of *Pisaster ochraceus*.

SASTRY, D.R.K. - echinoderms of coral reefs.

SCALLY, K. - tooth form function and evolution of invertebrate dental systems, especially tooth sharpening behaviour (thegosis).

SCHELTEMA, R.S. - distribution of echinoderm larvae in Antarctic waters, specifically in vicinity of South Shetland Islands - Bransfield Strait etc.

SCHOPPE, S. - echinoderms of Leyte, Philippines; coral reef protection and rehabilitation; interspecific relationships; biodiversity.

SCHUETZ, A.W. - development of a new model for multiparameter analyses of perturbations of gametic and embryonic processes.

SEETO, J. - taxonomy of Fiji holothurians.

SERAFY, D.K. - zoogeography of Atlantic echinoids.

SHEPHERD, S.A. - food web studies; comparison between abalone and sea urchins.

SHIRLEY, T.C. - predator-prey and competitive interactions between sea otters, crabs and starfish in Glacier Bay, Alaska.

SIBUET, M. - taxonomy and ecology of deep sea echinoderms.

SINGLETARY, R.L. - ecology of the seastar *Asterias forbesi*.

SKOLD, M. - population dynamics, growth, regeneration, feeding and predator-prey interactions in brittle stars; structuring mechanisms in marine benthic populations; interactions between burrowing heart urchins (*Brissopsis lyrifera*) and brittle stars (*Amphiura chiajei*); passive suspension feeding in *Amphiura filiformis* (Echinodermata: Ophiuroidea).

SLOAN, N.A. - sea cucumber fisheries.

SMILEY, S. - annotated catalogue of holothurians with synonymies; annual cycle of *Parastichopus californicus*, changing conditions of body wall muscles.

SMIRNOV, A.V. - deep-water holothurians from New Caledonia; Arctic and North Pacific echinoderms fauna; taxonomy of apodid holothurians.

SMIRNOV, I.S. - taxonomic studies of arctic and antarctic ophiuroids, creation of illustrated computer key for arctic brittle-stars and data bases on ophiuroids of Arctic and Southern Oceans.

SMITH, A.C. - pathology; phylogenetic connections to protochordates and vertebrates; immunology; hematology; body fluids as possible diagnostic reagants.

SMITH, A.B. - morphological and molecular phylogenies of echinoderms; Maastrichtian and Palaeocene echinoids.

SOLIS-MARIN, F.A. - evolution of echinoids; taxonomy of the phylum.

SOLOVJEV, A.N. - Holasteroid and spatangoid echinoids (evolution, classification, paleoecology); echinoids on the Cretaceous/Paleogene boundary.

SONNENHOLZNER, J.I. - taxonomic study on echinoderms from the Ecuadorian coast; distribution and abundance of echinoids and ophiuroids intertidally in Santa Elena Bay, El Guayas, Ecuador; ecology and biology of *Tripneustes depressus* in Machalilla National Park, Manabi; ecology of sand dollars (*Encope micropora*) in shallow waters from El Guayas, Ecuador.

STAMPANATO, S. - Antarctic starfish.

STANCYK, S.E. - population biology, predation and regeneration of *Ophiura sarsi*; sublethal predation of echinoderms; use of markers and growth rings of ophiuroid ossicles for age/growth studies.

STEWART, B.G. - biology of the euryalid snake star *Astrobrachion constrictum*.

STICKLE JR., W.B. - the systematic status, zoogeographical distribution, and environmental physiology of sea stars belonging to the Leptasterias species complex; focusing on species differences in the adaptation to a freshwater lens system that develops annually at Little Port Walter, southern tip of Baranoff Island, southeastern Alaska (with Jeff Tamplin, Ph.D. Student).

STORC, R. - ophiuroids from the Upper Cretaceous (Cenomanian-Turonian) of the Bohemian Cretaceous Basin (Czech Republic).

STRATHMANN, R.R. - developmental plasticity of larvae; limits on the aggregation of embryos; evolution rates of development of embryos.

STUMP, R.J. - population dynamics of *Acanthaster planci* (L.).

SUMIDA, P.Y.G. - ecology and ontogeny of the post-larval development in deep-sea ophiuroids.

TABLADO, A. - systematics of Asteroidea from southwestern Atlantic and Antarctic Peninsula.

TAHERA, Q. - systematics, taxonomy of echinoderms of the Arabian Sea.

TAKAHASHI, K. - physiology of the madreporite; physiology of echinoid spine muscle and catch apparatus; motile mechanism of echinoderm sperm flagella.

TAVARES, Y.A.G. - ecology, histology, morphology studies of *Mellita quinquiesperforata* in beaches of Parana's State, relation between morphodynamics and spatial distribution.

TELFORD, M. - collagen in tooth support mechanism of clypeasteroids; podial forces in *Asterias*; computer simulation of *Dendraster* distribution.

THANDAR, A.S. - study of new records of shallow water holothuroids from the South African east coast.

THIERRY, J. - systematics, morphology, evolution, ecology, palaeobiogeography, biostratigraphy and biometrics-shape analysis of Jurassic irregular echinoids.

THORSEN, M.S. - the ecophysiology of the irregular sea urchin *Echinocardium cordatum* - interactions with gut microbiota.

TOMINAGA, H. - biology of the sand dollar, especially key-hole urchins: *Echinodiscus tenuissimus* and *Astriclypeus manni* in Japan, encompassing population study, growth, development, age determination etc.

TRONCOSO, J.F. - identifying collections of Antarctic echinoderms in the Natural History Museum of Concepcion, Chile; studying several species of echinoderms from the Pacific coast Eight Region; the conservation problems of the echinoderms of Chile and their future projection.

TUTERA, P. - monograph of the irregular echinoids of Prydz Bay, Antarctica; new *Pachycentrotus* species

UBAGHS, G.J. - Upper Cambrian echinoderms from the Montagne Noire (southern France).

v.JUTERZENKA, K. - ecology of Arctic ophiuroids; ecology of the marginal sea of the eurasian Arctic (German -Russian investigators; GRIEMSEN).

VADAS, R.L. - ecology and reproductive biology of sea urchins along the coast of Maine. Funded by NOAA Sea Grant (1995-1997); temporal and spatial variability in reproduction and roe yield in green sea urchins. Tentatively funded by Maine Dept. Mar. Res. (1996-1997).

VADET, A. - Triassic echinoids of St. Cassian; revision of all the Jurassic echinoids.

VALENTINE, J. - role of sea urchins in structuring seagrass productivity.

VAN DER HAM, R.W.J.M. - *Hemiaster* and *Echinogalerus* of the Upper Cretaceous of NW Europe.

VANDENSPIEGEL, D. - the defensive mechanism of the Echinodermata: structure and functions of the Cuvierian tubules.

VIKTOROVSKAYA, G.I. - reproduction of invertebrates in artificial and natural conditions.

VISTISEN, B.K. - studying the two brittle stars *Ophiura albida* and *Amphiura filiformis* concerning their tolerance towards hypoxi with and without the presence of hydrogenesulphide.

WAREN, A.H. - gastropods parasitic on echinoderms.

WASSON, K. - reproduction and factors that control reproduction in echinoids.

WATTS, S.A. - steroid metabolism in echinoids.

WEBSTER, G.D. - Late Devonian crinoids and asterozoans (with Dan Blake and Dan Hafley) from west central Colorado; Osagean crinoids from western Montana; middle Pennsylvanian crinoids from northwestern Colorado (with Karen Honck); continue tabulation of Paleozoic crinoids and coronates for bibliography and index.

WELSCH, U. - innervation of the juxtaligamental cells in crinoids; analysis of the connective tissue of crinoids.

WILKIE, I.C. - functional morphology and mechanics of the echinoid lantern; functional morphology and mechanics of the ophiuroid mouth-frame; organisation, mechanics and physiology of echinoderm connective tissues; autotomy mechanisms of echinoderms and other invertebrates.

WILLCOX, M.S. - molecular phylogeny of asteroids; genetic basis to salinity adaptation in asteroids.

WORHEIDE, G. - actuopaleontology and ecology of *Astrosclera willeyana* Lister 1900 (Demospongiae) (for Ph.D. thesis); taphonomy of coral reef echinoids.

WRAY, G.A. - evolution of body-patterning genes in echinoderms; evolution of echinoderm larvae; phylogeny of echinoids.

YANAGISAWA, T. - larval development from plutei to metamorphosis of the sea urchins in the Ogasawara (Bonin) Islands.

YOSHIZATO, K. - molecular evolution of invertebrate collagen.

ZAVODNIK, D.V. - fauna and flora of the Adriatic Sea - Echinoderm distributional patterns.

ZITT, J. - crinoids (Cyrtocrinida, Isocrinida, Comatulida, Roveacrinida) from the Lower Cretaceous of the Moravian Carpathians and Upper Cretaceous of the Bohemian Cretaceous Basin (main emphasis to taphonomy); echinoids from the Upper Cretaceous of the Bohemian Cretaceous Basin (Cenomanian-Turonian Boundary interval).

********** INFORMATION REQUESTS **********

Bauer, J.C. - information on bacterial diseases in echinoids would be greatly appreciated. Also any effects of increased sea-water temperatures on these diseases would be helpful.

Benejam de Suarez, C. - requests information on the occurrence of any brooding *Amphiodia* along the California coast, northward.

Feder, H.M. - (1) would like to make contact with anyone working with asteroid or ophiuroid feeding biology and ecology in subarctic regions; (2) my work in the Bering and Chukchi Seas suggests that asteroid abundance increases to the north of these areas as fish predation decreases. Cold water on the shelf of these seas precludes movement of bottomfishes there in most years which appears to increase food availability on the bottom for sea stars. The original observation of this was by Dr. A.A. Neiman in 1963 when she worked in the eastern Bering Sea. I find large numbers of sea stars (mainly *Asterias amurensis* but also *Leptasterias polaris* and others) in the southeastern Chukchi Sea where large numbers of bottom-feeding fishes seldom occur. I would like to make contact with anyone familiar with this observation who would be interested in pooling information for development of a paper for publication.

Feral, J.-P. - would appreciate to receive 70-80% ethanol fixed ovaries of *Echinocardium* spp. from anywhere in the world, and of *Sterechinus* spp. and brood-protecting schizasterids from Antarctic. Alcohol should be of "good" quality. Specimens should also be fixed in ethanol. A label should give identification (if possible), place of sampling with depth and substrate (with latitude and longitude if possible), date of sampling. The purpose is to extract DNA for sequencing to reconstruct phylogenies.

Hottenrott, S.I. - would be grateful for specimens of the deep sea genera *Ophiomusium* and *Ophiosphalma*, especially type material. Information on collecting localities and depth is also valuable, as are reprints of any current research (ecology, behavior, genetics, etc.) involving these groups. Also any information on (or reports of) troglobitic (cave dwelling) echinoderms.

Jaeckle, W.B. - interested in any sightings or other information on asexual reproduction by asteroid larvae.

Janies, D. - would like to obtain frozen or ethanol preserved tissues of asteroids, especially of the order Velatida. Echinoderm embryos.

Kurihara, T. - interested in spatial distribution of starfishes, especially. Any information about this will be much appreciated.

Mouchaty, S. - interested in any information on the species distributions and on collections of mellitids. I request information on tissue collections (frozen or preserved in alcohol) available for research.

Munk, E.J. - Has the CCSNI completed its work? If so, how could I go about getting a copy of the AFS publication which gives common names of N.A. echinoderms?

Sastry, D.R.K. - would appreciate reprints of publications on biology and ecology of coral reef echinoderms.

Štorc, R. - detailed studies of microstructure, morphology and functions of skeletal elements in recent brittle-stars are needed for an evaluation of fossil disarticulated skeletons. I'd like to participate in such a study.

Stump, R.J.W. - still interested in post-doctoral study involving population dynamics, use of echinoderms as bioindicator species, and ecological modelling.

Tahera, Q. - would appreciate any publication on echinoderms related to taxonomy, systematics, reproduction, larval distribution and biodiversity (would like to be on reprint mailing list).

Viktorovskaya, G.I. - would be grateful to the specialists and institutions if they would send reprints of transactions of international conferences, and papers and books on invertebrates (sea urchins, crabs, crustaceans and molluscs).

Pacific Research Fishery Center (TINRO)
4 Shevchenko Alley
Vladivostok, 690600 Russia

********** SUGGESTIONS **********

Zítt, J. - I am looking for taphonomic papers on crinoids and echinoids. Taphonomy of echinoderms should be summarized into a book during the next years. I can cooperate. Also, ontogeny of recent isocrinids should be studied in detail, mainly in regards to the stem variation. Detailed investigation of comatulid centrodorsal and associated structures from the point of view of the microstructure, anatomy and functions is necessary. Taphonomy of echinoderms in shallow sublittoral is poorly known.

********** ANNOUNCEMENTS **********

David Lane has located significant numbers of the world's most massive sea star, *Thromidia catalai* at Manado. This I believe, is the first record of this species in the Indonesian Archipelago. Details will shortly be appearing in a forthcoming issue of the Raffles Bulletin of Zoology. zoolane@nus.sg

Carlos Cintra - We are forming an Echinoderms Collection that is going to be held in the "Museo de Historia Natural" de la Universidad Autonoma de Baja California Sur, La Paz, B.C.S., Mexico. In this one, we have some specimens collected in different points of the south region of the Gulf of California, a few from the north area, and some from the Revillagigedos Islands.

As was mentioned (CURRENT RESEARCH SECTION), the sea cucumber project is very important because it will enable us to know some basic aspects of the biology of the holothuroid. Also, we would like to make an evaluation of the actual fisheries of these organisms, for the purpose of bringing elements for an effective future management of the resource (if possible). Afterwards, the study will be applied in more populations of sea cucumbers in my country.

Dr. D.B. James, Senior Scientist, Tuticorin Research Centre, India, served as FAO Consultant for sea cucumbers in the Maldives from 12-12-95 to 22-12-95.

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contributed by J.M. Lawrence -

From the Annual Report of the Exeter City Museums and Art Gallery: "Professor David Nichols (Department of Biological Sciences, University of Exeter) very kindly donated much of his personal collection of books and papers relating to the echinoderms. This is the perfect complement to the existing Sladen Bequest library and updates our holding of literature of this fascinating phylum. The Sladen collection has continued to attract international research."

********** AN OFFER **********

Campbell, D.B. - I have 25 copies of a reprint given to me by the author upon his retirement from the Uionversity of New Hampshire. I'll be happy to mail a reprint to whomever would like one.

Lavoie, M.E. 1956. How sea stars open bivalves. Biol. Bull. 111(1): 114-122.

Mail reprint requests to: David B. Campbell,
Chair, Biology Dept.
Rider University
2083 Lawrenceville Rd.
Lawrenceville, N.J. 08648

********** UPCOMING CONFERENCE **********

Rodriguez, S.R. -
The Fourth International Temperate Reef Symposium will be held at the Catholic University of Chile, Santiago, 21-25th July 1997.

Details of symposia topics, registration and accommodation (including budget) to :

Coordinator 4th ITRS
Departamento de Ecologia
Facultad de Ciencias Biologicas
Universidad Catolica de Chile
Casilla 114-D Santiago, Chile

Phone: (56) 2- 686 2729
Fax: (56) 2- 222-5515
e-mail: reef@genes.bio.puc.cl

********** ITEMS OF INTEREST **********

An Addendum to Mortensen's Monograph of the Echinoidea

Hidden away at the end of the final volume (Vol. 5 $_2$, 'Spatangoidea II') of Theodore Mortensen's *Monograph of the Echinoidea* (1928-51) are 10 pages of additional notes. It is in these final pages that he gives his key to the orders of the Class Echinoidea, on the grounds that, at the outset of his monumental exercise, "it was not at all clear to me what would be the natural classification of the whole class". He also summarises the zoogeographical distribution of the echinoids, plus a few extra remarks on the biology and folklore of the group.

But possibly the most fascinating part of this codicil is the opportunity he takes to let rip at some of his zoological colleagues. Mortensen was never one to miss the chance of a good curse if he thought a scientific misdemeanor had been committed, or merely if he wished to get back at somebody who had once had a go at him. So here in the last couple of pages or so is a series of vituperative attacks. First to receive admonition is J.P. Lambert (co-author with P. Thièry of *Essaie de nomenclature raissonnée des Echinides*, 1924, for which work he says he is "deeply indebted"), who is pitched into thus:

"...the way in which particularly Lambert treats the nomenclature, arbitrarily adopting old, impossible names instead of names otherwise unanimously used in the whole echinological literature and thus changing the good old names and interchanging them...or using them in quite a new meaning...and then impertinently, as a dictator, changing the names also of the recent forms, about which he knows next to nothing, can only be characterised as a crime to science."

Then after positively fawning over Alexander Agassiz (*Revision of the Echini*, 1872-74) with these words:

"With immense learning and energy he cleared up the older literature on the recent Echini... This work will remain classical, the foundation of the study of the recent Echini; and most of the photographic illustrations are simply perfect, nothing like it ever having been published",

he launches into a bitter diatribe against him:

"However, there was much to criticise in the *Revision of the Echini*...but much worse I found his second great work, the report on the "*Challenger*" Echinoidea (1881)... Going into a critical study of the work I could not help finding it - I cannot help saying it - a bad piece of work, not at all worthy of the author".

Agassiz had had the temerity to criticise Mortensen's own habit of giving, not the magnification of his figures of pedicellariae, but the numbers of the objectives and eyepieces from which they were drawn. Mortensen's outrageous excuse for doing this is:

"To anybody accustomed to the study of pedicellariae and other minor structures, it does in general not matter very much to know the exact magnification by which such figures are drawn".

This seldom-read section is a marvellous example of fulminatory bile. Have others any examples of personal attacks from the echinoderm literature?

--- David Nichols, Exeter, UK

A BRIEF HISTORY OF ASTEROID TAXONOMY
by Ailsa Clark

The oldest important treatise on sea-stars was Linck's monumental pre-linnaean work (1733) but this divided them into 'genera' by using arm number as a primary character. Linnaeus himself (1758 and thereabouts) had little time to spare for them and lumped the lot back into *Asterias*, some of his species depending on the illustrations of Linck and others. In 1815 Lamarck had a free field and described a number of genera and species, his names being mostly still valid today.

However, after this a period of flux set in, beset by coincidence of independent workers prone (I suspect) sometimes to patriotic bias and maybe poor linguistic facility. The first coincidence happened about 1840 when J.E. Gray at the British Museum and J. Müller and F.H. Troschel in Germany turned their attention to asteroids. Gray, as it proved, had a keen eye for a 'good' genus but gave only infuriatingly brief 'descriptions' of many of his new taxa. Müller & Troschel had a poorer concept of generic limits (for instance their *Astrogonium* included four of Gray's genera) but did give more detail. In 1842 they adopted some of Gray's names but his 1847 and 1866 papers reiterated his earlier classification. Perhaps this was due to pressure of work on his other duties as Keeper of Zoology or difficulty in reading German - a handicap I suffered myself, particularly when I started.

All these early descriptions of starfishes were limited to external characters. However, in the later nineteenth century, E. Perrier in Paris exploited the use of sodium hypochlorite (bleach) in cleaning off skin and also dismembered some of his specimens, thereby illuminating the three-dimensional relationships and variations of parts of the skeleton, besides studying the detailed forms of the pedicellariae. From this he drew up a classification of the higher groups. His revision of the asteroids of the Paris Museum in 1875 incorporated study of some of Gray's types in London as well as Lamarck's and other specimens in Paris. Unfortunately this work was marred by absence of illustrations. Sadly for British pride, Perrier's opposite number in London at the time was Jeffrey Bell, a casual and careless observer who often widly misplaced his new nominal species, such as *Asterias longstaffi* - an astropectinid - and probably gave rise to a greater number of synonyms than almost any other taxonomist. His resentment of criticism and reluctance to submit his types to scrutiny led others such as the easily-roused Mortensen to resort to dealing through a third party to gain access to specimens in the British Museum.

Fortunately, Bell was passed over when it came to working up the vast collections made during the circumnavigation of the 'Challenger' and the job was given to Percy Sladen, a school teacher rather than a museum man. In 1889 Sladen's deeply researched 'Challenger' report included elaborate and well-illustrated descriptions of his many new species, among others, and most of his names are used today, though his use sometimes of Linck's inadmissable pre-linnaean names meant some needed changing. However, all his work was done without looking under the skin and superficial armament and his higher classification was based more on obvious differences like those shown by the marginal plates. Because of his monographic treatment of the class, other specialist neontologists, such as Fisher and H.L. Clark in the first half of the twentieth century, followed Sladen's classification, rather than that of Perrier, though Fisher's excellent studies extended to many internal characters. H.L. Clark worked also on the other classes of echinoderms, as did Koehler. Another stalwart of the same time was Döderlein who produced some massive monographs, mainly on asteroids, in the 'Siboga' reports (1917, 1920, 1921, 1924, 1935 and 1936), the early ones suffering from the isolation of Germany at the end of the first world war. Possibly here again, patriotic bias and difficulty in understanding Döderlein's very 'long-winded' prose daunted or

delayed some students from discovering the value of his taxonomic ideas.

It took the palaeontologists W.K. Spencer and C.W. Wright in the 'Treatise of Invertebrate Paleontology' (1966), to re-evaluate the classification, concluding that Perrier's higher classification was better than that of Sladen. This has been generally accepted and built on further in recent years, notably by Dan Blake. Meanwhile, some of us have been trying to settle problems at the generic and specific level.

Hopefully, thanks to all these and many others whose names cannot be mentioned for lack of space, the classification of asteroids (dare I say) has now achieved a fair degree of stability. Please don't rock the boat when I'm gone chums. It would be nice to think ones efforts had some lasting effect!

OBITUARY - DAVID DILWYN JOHN - FROM WHALING TO WALES VIA ECHINODERMS

(by Ailsa M. Clark)

Dilwyn John spent his early post-graduate years working with the Discovery Investigations - currently absorbed in the Institute of Oceanographic Sciences of the U.K. In the twenties and thirties this was primarily concerned with biological problems associated with whales and whaling and entailed his participation in long voyages to the Southern Ocean studying marine life. In 1927 and '28 he was Chief Scientist aboard the Royal Research Ship 'William Scoresby', working mainly in the Falkland-Magellan area, and from 1931 to '33 the R.R.S. 'Discovery 2' - successor to Scott's ship. The latter made the first winter circumnavigation of the Antarctic continent and worked many series of collecting stations between the pack-ice and the Falklands, also South Africa and Australasia, which must often have been very uncongenial, exposed to the daunting conditions in those parts but compensated by exciting discoveries of strange animals or observations new to science. At that time he specialized in the study of euphausians (krill) the prime food of most southern whalebone whales. However, when in the mid-1930's, he transferred to the Natural History Museum - then called the Brtish Museum (Natural History) - it was to become curator of echinoderms, which had previously been dealt with by the curator of annelid worms. In this second career he was able to use his knowledge of antarctic biology in preparing several reports on the crinoids collected by the Discovery Investigations and other expeditions to the Southern Ocean, published between 1937 and 1939, which included new observations on life histories. After returning to South Kensington from war service, he turned to the asteroids and began a series of notes on historic specimens in the museum collections, particularly the type specimens, many of which dated back to around 1840 and had been named by J.E. Gray - a master of brevity to the puzzlement of later generations of students. Promotion to the deputy keepership of Zoology and then his elevation to be Director of the National Museum of Wales in 1948 cut short this revision, which devolved to me as his successor. Only two of his notes - both on astropectinids - were published. Later I read some of his correspondence with colleagues and laymen about echinoderms and was impressed not only with his willingness to give time to helping others wherever possible but also with his erudition and sense of humour. His elevation to high rank in the museum service was a considerable loss to marine science.

********** ECHINODERMS IN LITERATURE **********

Oe, K. 1974. The Silent Cry. "The young man had an enormous round head, the broad, helmetlike curve of his forehead giving the whole head the appearance of being a continuation of the face. The cheekbones projecting outward on each side and the blunt, square chin reminded one of nothing so much as a sea urchin in human guise. ... She was quite obviously suspicious of the Sea Urchin for having conferred with Takashi in a low voice, resolutely ignoring us. ... In a strong breeze that blew aimlessly about the valley beneath a blue sky, the young men were kicking the football around in silence and with suffocating intensity of purpose. The Sea Urchin in particularly was dashing about desperately, a thick towel wound round the head that sat so incongruously large on his short trunk."

Kipling, R. 1912. Just So Stories. "In the sea, once upon a time, O my Best Beloved, there was a Whale, and he ate fishes. He ate the starfish, and the garfish, and the crab and the dab, and the plaice and the dace, and the skate and his mate, and the mackereel and the pickereel, and the really truly twirly-whirly eel." From: "How the Whale got his Throat"

Morgan, B. 1992. Random Passage. "Each morning the children searched the beach for driftwood, feathers, shells, smooth stones, star fish, and the bleached bones of small creatures washed up by the sea."

-- contributed by J.M. Lawrence

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HOW I BEGAN TO STUDY ECHINODERMS ... Part 6.

Freeman, Steven M. - (The University of North Wales).

"The Star Shaped Disc"

As an undergraduate I spent one year working as a Naturalist on the west coast of Florida. Not being a native to these parts my first experience wading the shallows off Key Island was not one I'll forget easily! It wasn't the feeling of fish brushing against my skin, a reaction I thought provoked by the novelty of my pale legs, it was the curious lump under my foot. A closer examination revealed, to my amazement, a finely patterned star on the under side of an animal shaped like a disc.

Following this informal introduction to the sand dollar I soon became fascinated with all aspects of echinoderm life. At the end of my stay in the United States I returned to England, with my new found passion, to finish my studies. Shortly after graduating, I secured a scholarship to do a PhD at the University of North Wales. Now I spend my days dedicated to continuing this fascination, but with other members of the Asteroid family.

McClintock, James B. (The University of Alabama at Birmingham). As an incoming freshman at the University of California at Santa Cruz in the mid 1970's, my interests leaned towards English Literature. However, soon thereafter an intense and provocative Introductory Biology course presented simultaneously by three professors turned the tide, and I knew I had found my niche in the field of Biology. In my Junior year I had a marvelous opportunity to enroll in a ten-week Marine Invertebrate Course at Bodega Marine Laboratory, on the rocky coastline of northern California. Although the group of organisms that the course focused on changed each year, I was fortunate enough to come along at the exact time that Echinoderms made their debut as a course topic! For the next ten weeks, my fellow students and I were immersed in lectures on Echinoderm Biology. Moreover, each of us conducted hands on research on some aspect of echinoderm physiology, behavior, ecology, etc. The course had such a profound effect on the students involved that it really does not surprise me to look back 20 years and see that a number of the students in this course have successful careers working with echinoderms (for example Scott Smiley and Tim Pennington to name a few). The course also brought me together for the first time with John Pearse, who was, and remains, a guiding force in my professional career and echinoderm studies.

John Pearse invited me to work in his laboratory during the senior year of my undergraduate career. I conducted a senior thesis on the growth of the echinoid *Strongylocentrotus purpuratus* in contrasting habitats of the rocky intertidal. My interests in echinoderms grew and following the advice of John Pearse, I applied to conduct my graduate studies in the laboratory of John Lawrence at the University of South Florida. Here, I found a dynamic environment where I was guided by a leader in the field of Echinoderm Biology and surrounded by fellow students engaged in studying diverse aspects of echinoderm biology, encompassing echinoderm phylogeny, physiology, and ecology. In 1983, John Lawrence invited me to work on aspects of echinoderm reproduction on the subantarctic island of Kerguelen. This experience laid the foundation for six subsequent trips to the Antarctic sponsored by the NSF to study echinoderm reproduction, nutrition, chemical ecology and population biology. My antarctic work included a Postdoctoral Fellowship with John Pearse, investigating aspects of larval and reproductive biology in echinoderms at McMurdo Sound.

Now an Associate Professor at the University of Alabama at Birmingham, my graduate students and I have continued with studies of echinoderms. My Advanced Invertebrate Zoology course focuses specifically on the Echinodermata, providing students a rare opportunity to spend an entire semester studying this group. It has been fun to share my enthusiasm for echinoderms with both undergraduate and graduate students. And it is through my students that I find myself rediscovering the unique nature of this fascinating group of animals.

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********** THESES AND DISSERTATIONS **********

AUSTRALIA

Ph. D. Dissertation

STUMP, R.J.W. 1995. Age determination and life-history characteristics of *Acanthaster planci* (L.). Zoology Dept. JCUNQ, Townsville.

BELGIUM

Ph. D. Dissertation

WARNAU, M. 1996. Valeur bioindicative des adultes et effets du contaminations métalliques sur les stades prémétamorphophiques de l'echinide *Paracentrotus lividus*, espèce-clé des herbiers à *Posidonia oceanica* de Méditerranée. Docteur en Sciences, Université Libre de Bruxelles, Bruxelles.

CANADA

Ph. D. Dissertation

NAKAMURA, R. 1995. A Current Affair: the role of hydrodynamics in the ecology and evolution of the Pacific sand dollar *Dendraster excentricus*. University of Toronto, Ontario.

FRANCE

Doctorat (Ph. D. Dissertation)

POULIN, E. (in progress, early 1996) - Adaptative significance and evolutionary consequences of brood-protection in the subantarctic marine benthic invertebrate *Abatus cordatus* (Verrill, 1876) (Echinodermata: Spatangoida). Universite Montpellier II

SAN MARTIN, G.A. 1995. Contribution à la gestion des stocks d'oursins: étude des populations et transplantations de *Paracentrotus lividus* à Marseille (France, Méditerranée) et production de *Loxechinus alba* á Chiloé (Chili, Pacifique). Docteur de l'Université Aix-Marseille II, Marseille.

DEA

BENOIT, O. 1995. Réponses adaptatives des populations de l'oursin *Sphaerechinus granularis* aux fluctuations de l'environnement. Rapport de DEA, Océanologie Biologique, Université de Bretagne Occidentale, Brest, France.

HABILITATION A DIRIGER DES RECHERCHES

GUILLOU, M. 1996. Réponses des populations d'échinodermes à la variabilité naturelle de l'environnement côtier. Université de Bretagne occidentale, Brest, France.

GERMANY

Ph.D. Dissertation

NEUMANN, C. (in progress). Calcareous dinoflagellate cysts of the Kirchrode II borehole (Albian, Lower Saxony Basin, Germany). Institut für Paläontologie der Freien Universität Berlin.

IRELAND

B Sc Geology

MANNIFIELD, K. 1995. Morphology and taxonomy of some Palaeozoic crinoids with some reinterpretations and new ideas. (Includes reinterpretation of *Ramseyocrinus*; a species of *Iocrinus* is lost; thoughts on *Amphoracrinus* and *Actinocrinites*; plus a new species of ?*Celtocrinus* from the Lower Palaeozoic of South Wales. University of Wales, Aberystwyth.

JAMAICA

M. Phil. Thesis

DIXON, H.L. 1995. Upper Oligocene echinoids of Jamaica. Unpublished thesis, University of West Indies, Mona, v+115 pp.

MEXICO

Bachelor's Science Thesis

Cintra Buenrostro, C. E. 1996-97? "Taxonomia y Biogeografia de estrellas de mar (Echinodermata: Asteroidea) en el Golfo de California, Mexico". Universidad Autonoma de Baja California Sur.

NEW ZEALAND

Ph. D. Dissertation

STEWART, B.G. 1995. The biology of the euryalid snake star *Astrobrachion constrictum* (Echinodermata: Ophiuroidea). University of Otago, N.Z.

M Sc

SEETO, J. 1995. The reproductive biology of the sea cucumber *Holothuria atra* Jaeger, 1833 (Echinodermata: Holothuroidea) in Laucala Bay, Fiji, with notes on its population structure and symbiotic associations. University of Otago, N.Z.

PAKISTAN

Ph. D. Dissertation

TAHERA, Q. (in progress). Systematics, reproduction and larval distribution of holothuroids and echinoids inhabiting the Arabian Sea. University of Karachi.

RUSSIA

Ph. D. Dissertation

BAZHIN, A.G. 1995. Species composition, condition of life and distribution of sea urchins genus *Strongylocentrotus* of seas of Russia. Institute of Marine Biology, Vladivostok (Far East Department of Russian Academy of Sciences). 126 p.

SCOTLAND

M. Phil.

McMurray, S.I. 1995. Morphological aspects of mutable collagenous tissues in *Ophiura ophiura* L. Glasgow Caledonian University.

Ph D Dissertation

NEWTON, L.C. 1996. Sublethal stress in echinoderms. Napier University, Edinburgh, U.K.

SWEDEN

Ph. D. Dissertation

SKÖLD, M. 1996. Population dynamics, growth, feeding and predator-prey interactions in brittle stars. Göteborg University.

UNITED STATES

Ph.D. Dissertation

AXON, A.G. 1992. Paleoecology of a Cincinnatian (Upper Ordovician) crinoid-garden community from southwestern Ohio. University of Kentucky, Lexington. 413 p.

BASCH, L.V. 1993. Nutrition and the ecology of some marine invertebrate early life history stages. University of California, Santa Cruz. xii + 233 pp.

BRYAN, P.J. 1995. Bioactivity of echinoderms from the northern Gulf of Mexico: antimicrobial, antifouling and antipredator defenses. University of Alabama at Birmingham. 118 p.

ETTENSOHN, F.R. 1992. Crinoid Paleoecology. University of Kentucky, Lexington.

GRABOWSKY, G.L. 1993. Constructing diversity: growth and form in elliptical sea urchins (Echinoidea: Echinometridae). Duke University, North Carolina.

JANIES, D.A. 1995. Reconstructing the evolution of morphogenesis and dispersal among Velatid Asteroids. University of Florida.

LARES, M.T. 1996. The effects of feeding frequency on feeding, digestion, production and metabolism of *Echinometra lucunter*, *Eucidaris tribuloides*, and *Lytechinus variegatus* (Echinodermata: Echinoidea). University of South Florida, Tampa.

Masters Thesis

BASCH, L.V. 1985. Ecology, behavior, and functions of bioluminescence in the subtidal sand-dwelling brittle-star *Ophiopsila californica* (Echinodermata: Ophiuroidea: Ophiocomidae). University of California, Los Angeles. xiv + 236 pp.

CARTER, K.P. 1996. Effect of cadmium on protein synthesis in the sea star *Luidia clathrata* (Say) (Echinodermata: Asteroidea). University of South Florida, Tampa.

HARSHANY, D.J. 1995. Direct and indirect measurements of production in *Luidia clathrata* (Echinodermata: Asteroidea). Univ. of South Florida, Tampa.

RUEDIGER, N.K. 1995. A morphometric analysis of archenteron elongation in *Lytechinus variegatus* (Echinodermata: Echinoidea). Univ. of South Florida, Tampa.

********** NEW BOOK ANNOUNCEMENTS **********

Jangoux, M., & J.M. Lawrence (eds.). 1996. Echinoderm Research. Volume 5. A.A. Balkema, Rotterdam. (Reviews: An index of names of Recent Asteroidea; Biological activities and biological role of triterpene glycosides from holothuroids; Adhesion in echinoderms; Mass mortality of echinoderms from abiotic factors; Extracellular matrix as mechanoeffector). c. 300 p.

A.A. Balkema Publishers, Postbus 1675, NL-3000 BR Rotterdam, The Netherlands
A.A. Balkema Publishers, Old Post Road, Brookfield, VT 05036-9704 (for Canada and U.S.)

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Jangoux, M., J.M. Lawrence (eds.). 1996. Echinoderm Studies. Vol. 5. A.A. Balkema, Rotterdam.
Flammang, P. Adhesion in echinoderms. pp. 1-60.
Lawrence, J.M. Mass mortality of echinoderms from abiotic factors. pp. 103-137.
Kalanin, V.I., M.M. Anisimov, N.G. Prokofieva, S.A. Avilov, Sh.Sh. Afiyaltullov, V.A. Stonik. Biological activities and biological role of triterpene glycosides from holothuroids (Echinodermata). pp. 139-182.

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Clark, A.M. An index of names of recent Asteroidea - Part 3: Velatida and Spinulosida. pp. 183-250.

A.A. Balkema, P.O. Box 1675, 3000 BR Rotterdam, The Netherlands. (Fax +31.10.4135947)
A.A. Balkema, Old Post Road, Brookfield, VT 05036, USA. (Fax 802.276.3837)

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Agatsuma, Y., Y. Sakai, T. Matsuda. Manual of artificial seeds of the sea urchin *Strongylocentrotus intermedius* for releasing in fishing grounds of Hokkaido waters, Japan. Hokkaido Fisheries Experimental Station.

I. Outline of the sea urchin fishery in Hokkaido
II. Ecology of *S. intermedius*
III. Removal of predators and competitors
IV. Releasing technique
  |Selection of seeds
  |Releasing season, size, location, density, and method
V. Management after releasing
  |Biomass of algae
  |Guarding against poaching
VI. Resource management
  |Optimal fishing size
  |Optimal exploitation rate
VII. Research techniques

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Wray, G.A. Molecular determinants of radial body organization in echinoderms. **Evolution of Development, Bodega Marine Lab, California, October, 1995.**

********** PAPERS PRESENTED AT MEETINGS **********

(by conference)

Papers presented at the Florida Echinoderm Festival, 18 November 1995, Eckerd College, St. Petersburg, Florida. Organized by John Ferguson.

Bellew, Patrick : Morphological variation in the genus *Endoxocrinus*.
Featherstone, Chuck (Nova Southeastern Univ.): A seasonal analysis of proximate composition of *Chlorodocrinus decorus* and *Endoxocrinus parrae*.
Ferguson, John (Eckerd College): Madreporite structure and function.
Foret, Timothy (Univ. of South Florida): Echinoderm-bacteria symbioses.
Lares, Michael (Univ. South Florida): Effect of feeding frequency on feeding rate and digestion in sea urchins.
Lawrence, John (Univ. of South Florida): Capacity for production in the Chilean sea-urchin *Loxechinus albus*.
McEdward, Larry (Univ. of Florida): Facultative feeding in imaginary echinoderm larvae.
McGovern, Tammy (Florida State Univ.): Balance between sexual and asexual reproduction in echinoderms.
Messing, Charles (Nova Southeastern Univ.): A test of niche partitioning in *Chlorodocrinus decorus* and *Endoxocrinus parrae*.
Polson, Emma (Univ. South Florida): Role of proteins in crystal formation in *Mellita tenuis*.
Rankan, Dana (Nova Southeastern Univ.): Contribution of skeletal elements of *Chlorodocrinus decorus* to sediment.
Ruediger, Nicole (Univ. South Florida): Archenteron elongation in *Lytechinus variegatus*.
Sewell, Mary (Harbor Branch Oceanographic Institution): Reproduction in synaptid cucumbers.
Turner, Richard (Florida Institute of Technology): Survey of echinoderms off the Florida Atlantic coast.

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Symposium: The Role of Cell-Cell Interactions and Environmental Stimuli in the Development of Marine Invertebrates. American Society of Zoologists. 1993. Papers published in the American Zoologist, 35 (4), 1995.

Degnan, B.M., D.E. Morse. Developmental and morphogenetic gene regulation in Haliotis rufescens larvae at metamorphosis. 391-398.
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Annual Meeting of the American Society of Zoologists, 26-30 December, 1995, Washington, D.C. Abstracts are in American Zoologist, 1995, vol. 35 (5). (communicated by J.M. Lawrence)

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Carr, H.A., D.J. McKiernan, P. Burns, & J. Harris. The sea urchin fishery in Massachusetts, current trends, concerns and research. 8-17.

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FEDER, HOWARD	FEEDING-BIOLOGY TROPHIC-INTERACTIONS ECOLOGICAL-INTERACTIONS
FELDMAN, ABBY	LARVAE ASTEROIDEA ECHINOCULTURE
FELL, JULIAN	GROWTH TAXONOMY BIOGEOGRAPHY ANTARCTICA
FERAL, JEAN-PIERRE	SPECIATION EVOLUTION DEVELOPMENT BIODIVERSITY-GENETICS MOLECULAR-PHYLOGENY
FERGUSON, JOHN	PHYSIOLOGY FUNCTIONAL-ANATOMY
FERNANDEZ, CATHERINE	NUTRITION GROWTH AQUACULTURE
FLAMMANG, PATRICK	FUNCTIONAL-MORPHOLOGY BIOCHEMISTRY ADHESION
FORET, TIMOTHY	SYMBIOSES NITROGEN-METABOLISM OSMOREGULATION
FOSTER, MERRILL	TAXONOMY BIODIVERSITY ECOLOGY EVOLUTION
FOX, DAVID	OPHIUROIDEA OSSICLES BEHAVIOR
FREEMAN, STEVEN	ASTEROIDEA PREDATION SUBLITTORAL POPULATION
FUJITA, TOSHIHIKO	OPHIUROIDEA ASTEROIDEA ECOLOGY TAXONOMY
GAGE, JOHN	ECOLOGY POPULATION-DYNAMICS BIODIVERSITY
GAGNON, JEAN-MARC	ECOLOGY BEHAVIOUR DISTRIBUTION TAXONOMY
GALLEMI, JAUME	ECHINOIDEA CRETACEOUS SYSTEMATICS BIOSTRATIGRAPHY PALAEOECOLOGY
GENTIL, FRANCK	OPHIUROIDEA POPULATION
GIBSON, MICHAEL	PALEOECOLOGY BIOTIC-INTERACTIONS
GIUDICE, GIOVANNI	MOLECULAR DEVELOPMENTAL BIOLOGY
GLUCHOWSKI, EDWARD	CRINOIDEA FOSSIL
GOGGIN, LOUISE	ASTEROIDEA PATHOLOGY

GOODING, RICHARD	ECHINOIDEA DIADEMATID-ASSOCIATIONS
GRABOWSKY-KAAIALII, GAIL	ECHINOIDEA MORPHOLOGY EVOLUTION PHYSIOLOGY
GREENSTEIN, BENJAMIN	ASTEROIDEA ECHINOIDEA TAPHONOMY FOSSIL RECENT CROWN-OF-THORNS STARFISH
GROSJEAN, PHILIPPE	CULTIVATION ECOLOGY GROWTH DIGESTION RESOURCES-ALLOCATION
GROVES, CATHY	ASTEROIDEA BIOGEOGRAPHY SYSTEMATICS
GRYGIER, MARK	PARASITOLOGY ASSOCIATED-CRUSTACEANS MYZOSTOMIDA-GALLS AND CYSTS
GUERRAZZI, MARIA	ASTEROIDEA
GUILLOU, MONIQUE	ECOLOGY ECOTOXICOLOGY PLASTICITY BIODIVERSITY
GURREA, ISIDRE	FOSSIL ECHINOIDEA CRETACEOUS CENOZOIC MEDITERRANEAN-REGION
GUTT, JULIAN	BIODIVERSITY ECOLOGY
HADEL, VALERIA FLORA	HOLOTHUROIDEA
HAGEN, NILS	ECHINOIDEA ECOLOGY DISEASE CULTIVATION
HAMEL, JEAN-FRANCOIS	ASTEROIDEA HOLOTHUROIDEA OPHIUROIDEA ECHINOIDEA BEHAVIOR REPRODUCTION MORPHOLOGY
HAMZA HASSAN, MOHAMED	ECOLOGY
HAUDE, REIMUND	TAXONOMY PALECOLOGY EVOLUTION
HAVARDSSON, BJORGOLFUR	ECHINOIDEA
HEINZELLER, THOMAS	CRINOIDEA ULTRASTRUCTURE NEUROANATOMY
HENDLER, GORDON	OPHIUROIDEA TAXONOMY BEHAVIOR FUNCTIONAL-MORPHOLOGY
HERDENDORF, CHARLES	ABYSSAL ASTEROIDEA BRISINGIDAE ECHINOIDEA
HESS, HANS	TAXONOMY PALEOECOLOGY TAPHONOMY CRINOIDEA
HILL, ROBERT	PHYSIOLOGY MUSCLE CONNECTIVE-TISSUE
HOLTERHOFF, PETER	CRINOIDEA FOSSIL PALEOECOLOGY SYSTEMATICS
HOOPER, ROBERT	ECHINOIDEA ECOLOGY BIOGEOGRAPHY TAXONOMY
HOROWITZ, ALAN STANLEY	FOSSIL BLASTOIDEA
HOSHI, MOTONORI	ECHINOIDEA ASTEROIDEA FERTILIZATION ACROSOME-REACTION GLYCOCONJUGATES SIGNAL-TRANSDUCTION
HOTCHKISS, FREDERICK	OPHIUROIDEA ECHINOIDEA ASTEROIDEA FOSSIL RECENT TERATOLOGY
HOTTENROTT, SUSAN	OPHIUROIDEA SYSTEMATICS CLADISTICS
IRIMURA, SEIICHI	OPHIUROIDEA TAXONOMY MORPHOLOGY ECOLOGY
ISHIDA, YOSHIAKI	PALEOECOLOGY OPHIUROIDEA
IVY, W. GRISILDA	HOLOTHUROIDEA
JABLONSKI, DAVID	ECHINOIDEA CRINOIDEA FOSSIL
JACOBSEN, NANCY	ASTEROIDEA TAXONOMY DISTRIBUTION REPRODUCTION
JAECKLE, WILLIAM	LARVAL-BIOLOGY ECOLOGY MORPHOLOGY PHYSIOLOGY
JAGT, JOHN	TAXONOMY PALAEOBIOLOGY BIOZONATION FUNCTIONAL-MORPHOLOGY
JAMES, DANIEL	HATCHERY CULTURE TAXONOMY ZOOGEOGRAPHY HOLOTHUROIDEA
JAMIESON, GLEN	BIODIVERSITY HABITAT-MODIFICATION SURVEY
JANIES, DANIEL	ASTEROIDEA EVOLUTION DEVELOPMENT
JELL, PETER	FOSSIL CRINOIDEA AUSTRALIAN
JOHNSEN, SONKE	PHOTORECEPTION POLARIZED-LIGHT DIFFUSE-SENSORY-SYSTEMS OPHIUROIDEA
JUNQUEIRA, ANDREA	REPRODUCTION RECRUITMENT SETTLEMENT POPULATION-DYNAMICS
KAMMER, THOMAS	FOSSIL CRINOIDEA SYSTEMATICS PALEOECOLOGY
KELLY, MAEVE	ECHINOCULTURE PSAMMECHINUS-MILIARIS NUTRITION GROWTH
KEUSKAMP, DON	ECHINOIDEA
KLINGER, THOMAS	ECHINOIDEA HOLOTHUROIDEA FEEDING ECOLOGY
KOBAYASHI, NAOMASA	ECHINOIDEA MARINE-POLLUTION BIOASSAY SPAWNING PERIODICITY
KOGO, ICHIZO	CRINOIDEA TAXONOMY DISTRIBUTION ECOLOGY
KURIHARA, TAKEO	ASTEROIDEA SPATIAL-DISTRIBUTION
LAMBERT, PHILIP	SYSTEMATICS HOLOTHUROIDEA TAXONOMY NATURAL-HISTORY
LAWRENCE, JOHN	NUTRITION REPRODUCTION PHYSIOLOGY STRATEGIES
LE MENN, JEAN	CRINOIDEA COLUMNALS TAXONOMY BIOSTRATIGRAPHY
LeCLAIR, ELIZABETH	OPHIUROIDEA MORPHOLOGY BIOMECHANICS
LESSIOS, HARILAOS	ECHINOIDEA PHYLOGENY POPULATION-GENETICS
LEVERONE, JAY	ASTEROIDEA REPRODUCTION
LIAO, YULIN	OPHIUROIDEA HOLOTHUROIDEA TAXONOMY CULTIVATION
LITVINOVA, NINA	OPHIUROIDEA TAXONOMY MORPHOLOGY BEHAVIOUR ECOLOGY
LORDSON, JINBERT	HOLOTHUROIDEA
MACURDA, JR., D.BRADFORD	BLASTOIDS CRINOIDEA MODERN PHANEROZOIC
MACZYNSKA, STEFANIA	ECHINOIDEA MIOCENE PARATETHYS-BASIN MEDITERRANEAN
MAH, CHRISTOPHER	ASTEROIDEA SYSTEMATICS BRISINGIDA DEEP-SEA
MAKRA, ATHENA	POPULATION-DYNAMICS BEHAVIOUR REPRODUCTION REGENERATION
MALLEFET, JEROME	BIOLUMINESCENCE PHYSIOLOGY NEUROBIOLOGY FUNCTIONAL-ECOLOGY
MANNI, RICCARDO	TAXONOMY EVOLUTION FUNCTIONALITY MESOZOIC-CRINOIDEA SACCOCOMA
MANNIFIELD, KAY	PALAEOECOLOGY TAXONOMY TAPHONOMY BIODIVERSITY-(+ EXTINCTIONS)
MASCARENHAS, BERNARDO JOSE	ASTEROIDEA ECOLOGY TAXONOMY POPULATION-DYNAMICS
MASSIN, CLAUDE	HOLOTHUROIDEA TAXONOMY ZOOGEOGRAPHY
MATERIA, CHRISTINE	TASMANIA ECHINODERM ECOLOGY REPRODUCTION
MATTOS-SEGOVIA, ELIO	ECHINOIDEA LARVAE REPRODUCTION EMBRYOLOGY DEVELOPMENT
McBRIDE, SUSAN	ECHINOIDEA FISHERIES AQUACULTURE
McCLINTOCK, JAMES	CHEMICAL-ECOLOGY REPRODUCTION NUTRITION ECOLOGY
McLELLAND, JERRY	OPHIUROIDEA TAXONOMY BIODIVERSITY
MEDEIROS-BERGEN, DOT	ECOLOGY GENETIC-IDENTIFICATION DISPERSAL
MERCIER, ANNIE	ASTEROIDEA HOLOTHUROIDEA OPHIUROIDEA ECHINOIDEA BEHAVIOR REPRODUCTION MORPHOLOGY
MESSING, CHARLES	CRINOIDEA PHYLOGENY ECOLOGY BIOGEOGRAPHY MORPHOLOGY
MEYER, CHRISTIAN	MEZOZOIC TAPHONOMY
MIRONOV, ALEXANDER	ECHINOIDEA
MITROVIC-PETROVIC, JOVANKA	ECHINOIDEA BIOSTRATIGRAPHY TAXONOMY PALEOECOLOGY EVOLUTION
MLADENOV, PHILIP	REPRODUCTION DEVELOPMENT ASEXUAL GENETICS
MOOI, RICHARD	ECHINOIDEA
MORRILL, JOHN	EMBRYOLOGY ECHINOIDEA
MOTOKAWA, TATSUO	CATCH-CONNECTIVE-TISSUE STALKED-CRINOIDS
MOUCHATY, SUZETTE	ECHINOIDEA CLYPEASTEROIDA SYSTEMATICS
MUNK, ERIC	GROWTH REPRODUCTION
NAIDENKO, TAMARA	ECHINOIDEA METAMORPHOSIS POLLUTION BIOASSAY CRYOPRESERVATION
NAKAMURA, RAYMOND	ECHINOIDEA ECOLOGY EVOLUTION BIOMECHANICS EDUCATION
NAKANO, EIZO	ECHINOIDEA EMBRYOGENESIS EXTRACELLULAR-MATRIX CELL-ADHESION
NEBELSICK, JAMES	ECHINOIDEA ECOLOGY PALAEONTOLOGY TAPHONOMY BIODIVERSITY
NEILL, BRUCE	BIOGEOGRAPHY ECHINOMETRIDS GENETICS SYSTEMATICS
NESTLER, HELMUT	ECHINOIDEA
NEUMANN, CHRISTIAN	CRETACEOUS ECHINOIDEA SPATANGOIDA PALEOECOLOGY STRATIGRAPHY
NICHOLS, DAVID	FUNCTIONAL-MORPHOLOGY EVOLUTION REPRODUCTION
NICOSIA, UMBERTO	TAXONOMY SYSTEMATICS JURASSIC TETHYS
NISHIHIRA, MORITAKA	ECOLOGY BIODIVERSITY POPULATION BEHAVIOR
O'CONNOR, BRENDAN	OPHIUROIDEA TAXONOMY BIOTURBATION DENSITY-REGULATORY-FACTORS
O'HARA, TIMOTHY	TAXONOMY NATURAL-HISTORY BIOGEOGRAPHY CONSERVATION
O'LOUGHLIN, P. MARK	HOLOTHUROIDEA
OJEDA, F. PATRICIO	ECOLOGY BIOLOGY ECO-PHYSIOLOGY
OJI, TATSUO	CRINOIDEA TAXONOMY EVOLUTION BIOGEOGRAPHY REGENERATION
OLSZEWSKA-NEJBERT, DANUTA	IRREGULAR-ECHINOIDS CRETACEOUS PALEOBIOGEOGRAPHY EVOLUTIONARY-TRENDS
OLVER, JANE	ECOLOGY ECHINOIDEA

PABIAN, ROGER	CRINOIDEA PALEOECOLOGY BIOSTRATIGRAPHY TAXONOMY
PAGETT, RICHARD	BRACKISH-WATER ECOLOGY ADAPTATION
PARMA, GRACIELA	FOSSIL ECHINOIDEA
PENCHASZADEH, PABLO	ECHINOIDEA ASTEROIDEA
PETR, VACLAV	FOSSIL CRINOIDEA
PHILIPPE, MICHEL	SYSTEMATIC PALAEOECOLOGY PALAEOGEOGRAPHY
PIEPENBURG, DIETER	OPHIUROIDEA ECOLOGY POPULATION-DYNAMICS PHYSIOLOGY
PIESSE, C.	TAXONOMY
PODOLSKY, ROBERT	ECHINOIDEA
PORTELL, ROGER	CENOZOIC ECHINODERMS-S.E. USA-CARIBBEAN
PRESTEDGE, GEOFFREY	PATIRIELLA-vivipara
PROKOP, RUDOLF JAN	CRINOIDEA EARLY-PALAEOZOIC BIOSTRATIGRAPHY TAXONOMY
REGIS, MARIE-BERTHE	BIOLOGY ECOLOGY POLLUTION ENVIRONMENT
REICH, MIKE	SYSTEMATICS PALAEOECOLOGY BIOSTRATIGRAPHY FOSSIL HOLOTHUROIDEA
ROBINSON, SHAWN	CULTURE FISHERY ECOLOGY POPULATION-DYNAMICS
ROCCATAGLIATA, ALEJANDRO	ASTEROIDEA OPHIUROIDEA PHYSIOLOGICALLY-ACTIVE-STEROIDS
RODRIGUEZ, SEBASTIAN	ECHINOIDEA ECOLOGY SPATIAL-DISTRIBUTION USE-OF-DRIFT-ALGAE
ROGERS-BENNETT, LAURA	ECHINOIDEA GROWTH
ROSE, EDWARD	FOSSIL ECHINOIDEA
ROTMAN CLARK, HELEN	ASTEROIDEA OPHIUROIDEA TAXONOMY ANATOMY
ROUX, MICHEL	BATHYAL-ECOLOGY ONTOGENY STALKED-CRINOIDEA JURASSIC-TO-RECENT
SABA, MASAKI	ASTEROIDEA TAXONOMY
SASTRY, DWADASI	TAXONOMY BIODIVERSITY ECOLOGY
SCHELTEMA, RUDOLF	LARVAE DISPERSAL BIOGEOGRAPHY RECRUITMENT SETTLEMENT
SCHOPPE, SABINE	ASTEROIDEA ECHINOIDEA OPHIUROIDEA TAXONOMY REPRODUCTION BIODIVERSITY
SCHUETZ, ALLEN	JUVENILES
SEETO, JOHNSON	TAXONOMY REPRODUCTIVE-BIOLOGY POPULATION-STRUCTURE ASSOCIATES
SERAFY, D. KEITH	ECHINOIDEA TAXONOMY ECOLOGY
SHEPHERD, SCORESBY	ECHINOIDEA ECOLOGY
SHIRLEY, THOMAS	CRAB-ASTEROID-INTERACTIONS
SHLEPR, MICHAEL	OPHIUROIDEA
SINGLETARY, ROBERT	ECOLOGY TAXONOMY
SKOLD, MATTIAS	OPHIUROIDEA REGENERATION DEVELOPMENT
SLOAN, NORMAN	HOLOTHUROIDEA FISHERIES
SMILEY, SCOTT	HOLOTHUROIDEA PHYSIOLOGY DEVELOPMENT EVOLUTION
SMIRNOV, ALEXEI	TAXONOMY ZOOGEOGRAPHY EVOLUTION PHYLOGENY PALEONTOLOGY HOLOTHUROIDEA
SMIRNOV, IGOR	POLAR-OCEANS OPHIUROIDEA DATABASES
SMITH, ALBERT	PATHOLOGY/PATHOBIOLOGY HEMATOLOGY IMMUNE-SYSTEM LINKS-TO-PROTOCHORDATES/VERTEBRATES
SMITH, ANDREW	PALAEOBIOLOGY SYSTEMATICS
SOLOVJEV, ANDREY	ECHINOIDEA EVOLUTION PALEOECOLOGY
SONNENHOLZNER, JORGE	ECOLOGY BIOLOGY TAXONOMY BIOSSAYS
STAMPANATO, SALVATORE	ASTEROIDEA
STANCYK, STEPHEN	OPHIUROIDEA REGENERATION PREDATION POPULATION GROWTH
STEWART, BRIAN	EURYALIDS OPHIUROIDEA REGENERATION
STORC, RICHARD	OPHIUROIDEA TAXONOMY PALEOECOLOGY CRETACEOUS
STRATHMANN, RICHARD	LARVAE EVOLUTION BODY-PLANS
STUMP, RICHARD	ASTEROIDEA POPULATION-DYNAMICS ECOLOGICAL-MODELLING ENVIRONMENTAL-MONITORING
SUTER, SHERMAN	ECHINOIDEA FOSSIL
TABLADO, ALEJANDRO	ASTEROIDEA TAXONOMY SOUTH-ATLANTIC
TAHERA, QASEEM	FAUNA BIODIVERSITY BIOLOGY LARVAL-DISTRIBUTION POPULATION-DYNAMICS
TAKAHASHI, KEIICHI	MUSCLE-PHYSIOLOGY SPERM-MOTILITY CONNECTIVE-TISSUE
TALBOT, TIFFANY	OPHIUROIDEA REPRODUCTION DEVELOPMENT BEHAVIOR FUNCTIONAL-MORPHOLOGY
TAVARES, YARA A.	ECHINOIDEA ECOLOGY REPRODUCTION POPULATION-DYNAMICS MORPHOMETRY
THANDAR, AHMED	HOLOTHUROIDEA TAXONOMY
THIERRY, JACQUES	ECHINOIDEA JURASSIC
THORSEN, MARIANNE	ECHINOIDEA GUT-MICROBIOTA
TOMINAGA, HIDEYUKI	ECHINOIDEA IRREGULAR-SEA-URCHIN AGE-DETERMINATION POPULATION-ECOLOGY DEVELOPMENT
TUTERA, PETER	TAXONOMY BIODIVERSITY CONSERVATION
UBAGHS, GEORGES	FOSSIL
v.JUTERZENKA, KAREN	OPHIUROIDEA ECOLOGY FEEDING-ECOLOGY GROWTH-BANDS ARCTIC-ECHINODERMS DEEP-SEA ECHINODERMS
VADAS, ROBERT	GRAZING BEHAVIOR REPRODUCTIVE-ECOLOGY
VADET, ALAIN	ECHINOIDEA TAXONOMY EVOLUTION
VALENTINE, JOHN	OPHIUROIDEA ECHINOIDEA ECOLOGY
VAN DER HAM, RAYMOND W.J.M.	ECHINOIDEA CAMPANIAN-MAASTRICHTIAN-DANIAN NW-EUROPE TAXONOMY
VANDENSPIEGEL, DIDIER	DEFENSIVE-MECHANISMS MORPHOLOGY SYMBIOSIS
VIKTOROVSKAYA, GALINA	REPRODUCTION INVERTEBRATES BIOTIC-ABIOTIC-CONDITIONS
VISTISEN, BODIL	OPHIUROIDEA
von BRAND, ELISABETH	HOLOTHUROIDEA CYTOGENETICS POPULATION-GENETICS
WASSON, KRISTINA	ECHINOIDEA REPRODUCTION
WATTS, STEPHEN	GROWTH REPRODUCTION NUTRITION PHYSIOLOGY HORMONES
WEBSTER, GARY	CRINOIDEA LATE-PALEOZOIC TAXONOMY PALEOGEOGRAPHY BIOSTRATIGRAPHY
WELSCH, ULRICH	CRINOIDEA MORPHOLOGY NERVOUS-SYSTEM CONNECTIVE-TISSUE
WHITE, CHRIS	CRINOIDEA LARVAL-BIOLOGY TAXONOMY SENSORY-BIOLOGY
WILKIE, IAIN	OPHIUROIDEA ECHINOIDEA FUNCTIONAL-MORPHOLOGY
WILLCOX, MARK	POPULATION-GENETICS MOLECULAR-PHYLOGENY EXPRESSED-GENES
WORHEIDE, GERT	ECHINOIDEA TAPHONOMY ECOLOGY ACTUOPALEONTOLOGY
WRAY, GREGORY	EVOLUTION DEVELOPMENT MORPHOGENESIS
YAMAGUCHI, MASASHI	ACANTHASTER-PLANCI RESOURCE-MANAGEMENT
YANAGISAWA, TOMIO	METAMORPHOSIS ECHINOIDEA DEVELOPMENT
YOSHIZATO, KATSUTOSHI	COLLAGEN EXTRACELLULAR-MATRIX ELM
ZAVODNIK, DUSAN	TAXONOMY ECOLOGY DISTRIBUTION ADRIATIC-SEA
ZEIDLER, WOLFGANG	TAXONOMY ASTEROIDEA
ZITT, JIRI	TAXONOMY PALEOBIOLOGY TAPHONOMY PALEOECOLOGY

PUBLICATIONS OF H. BARRACLOUGH (BARRY) FELL

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22 November 1995
Ms. Cynthia Ahearn, editor
Echinoderm Newsletter
Div. of Echinoderms MRC 163
Smithsonian Institution
Washington DC 20560

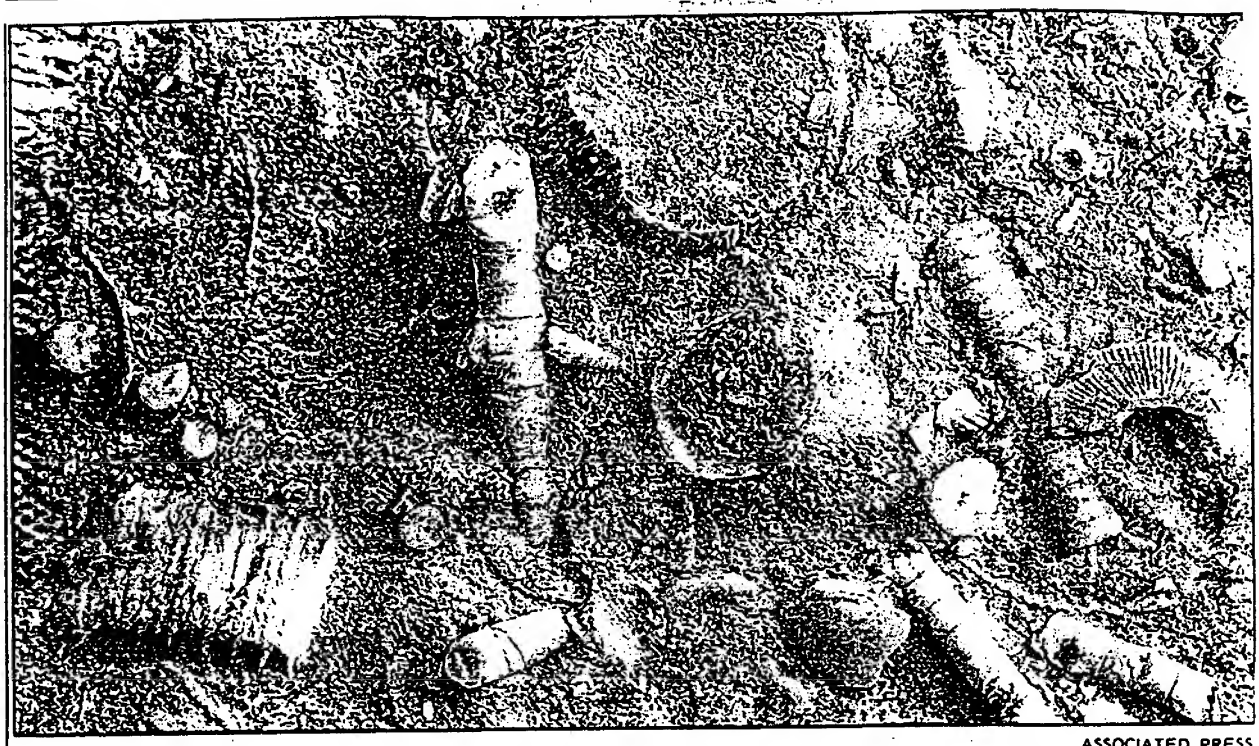
To the editor,

A call to arms! I have finally amassed enough evidence to indicate conclusively that a vile and subtle plot is underway. The enclosed pair of publications, extracted from sources completely separated by vast gulfs of time, space and culture indicate that an infernal brain is at work, a brain that has designed a most desperate yet insidiously clever gambit, a brain that will stop at naught to accomplish the complete and utter demolition of nothing less than our comfortable and well-documented paradigm of the classification and phylogeny of life on earth. Examine these publications carefully and what can you not fail to notice? In both of them appears the ostensibly gentle, yet deadly poisonous suggestion that (dare I breathe it myself, even on mute paper?), that crinoids are not echinoderms at all, but actually belong to that *other* kingdom, the plants! Note how the author of this cunning ploy has dropped the hints so widely, yet without so much as a breath of authorship associated with either: in one case, the widely respected Associated Press; in the other, a commercial collection of British videotapes. It can only mean that this nameless villain has insinuated itself (I cannot even suggest a gender) into every fiber of society. Note also the subtleness. In the first, there is a hint of uncertainty, that crinoids may be animals OR plants. In the second, the word is misspelled to throw us off the track. But we cannot be deceived. We must gird for battle, uproot this deadly scourge and expose the evil genius behind it. Remember, if crinoids are permitted to be wrenched from their pentamerous fold, what group will be next?

Yours in fear for his livelihood because he is not a botanist,

Charles

Charles G. Messing



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Brachiopod (ancient clam) and horn-coral fossils embedded in limestone left behind after this summer's floodwaters cut a 15-foot-deep gorge below the Coralville Lake Reservoir near Iowa City, Iowa.

Receding floodwaters reveal Iowa fossil bed

IOWA CITY, Iowa — This summer's raging floodwaters rolled back the clock 375 million years at Coralville Lake.

Water at the lake's dam has receded, but not before it washed away a couple of roads and cut an impressive gorge south of the dam's spillway that exposed hundreds of fossils from the Devonian Era.

"It's also known as the age of the fishes," says park ranger Randy Haas.

With good reason. Protruding from the soft limestone bed can be seen part of an ostracoderm, an armor-plated fish that grew up to 20 feet in length. Also on view are scores of brachiopods (ancient clams), horn corals, and crinoids, also known as sea lilies.

Crinoids "are an animal or plant or something in between. It depends on what archaeologist you talk to," Haas said.

Coralville Lake, four miles north of Iowa City, was created in 1958 with a dam project as a way to moderate stream flows on the Iowa River.

The dam regulates runoff from 3,084 square miles of land upstream to give flood protection to 1,703 square miles of Iowa River valley below.

But for 28 straight days over the summer, floodwaters cascaded over the top and cut the channel roughly 15 feet deep into underlying rock.

Flood-related repairs will have to be made, but Haas says they'll be done delicately. He envisions the area becoming a training ground for geologists and archaeologists, and a prime field-trip site for schoolchildren.